Persuasive health communication

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Persuasive Health Communication:
A Self-Perspective

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Chapter 1. General Introduction

"The only way to keep your health is to eat what you don't want, drink what you don't like, and do what you'd rather not"

Mark Twain (1835 - 1910)

Health messages aimed at persuading people to alter unhealthy habits are highly prevalent in western societies. Examples of such health messages are television commercials about the potential risks of smoking, websites about the risks associated with insufficient fruit and vegetable consumption, and leaflets about the negative health consequences of unsafe sex. All these messages have in common that they remind people of the potential health risks of their own lifestyle or habits. Until now, the main focus in health communication research has been on the role of fear or physical threat in motivating people to adopt a healthy lifestyle. For example, classic fear appeal theories such as the Drive Reduction Model (Hovland, Janis, & Kelley, 1953), Protection Motivation Theory (Rogers, 1983), and Parallel Response Model (Leventhal, 1970) specify information on the severity of the negative outcomes and people's susceptibility to the negative outcomes as the elements in health messages that are effective in motivating health behavior change. Based on these theories, health messages are expected to motivate people to alter their health habits because they emphasize the risks and dangers associated with unhealthy habits. People's physical health is portrayed as the core motivator of behavior change – that is, people want to maintain good physical health and act healthy to avert the physical threat. However, human behavior is not only governed by concrete actual or anticipated objective states, such as physical health or illness. Behavior can also be determined by more symbolic psychological motives. Specifically, the motive of preserving or enhancing a positive self-image is a powerful and prevalent cause of behavior. This self-perspective is commonly applied in social psychology in general. For example, the Self-evaluation Maintenance Model (Tesser, 1988) proposes that the key motivator of people's actions is the maintenance of a positive self-image. However, a self-perspective is still rarely used in the domain of persuasive health messages. I propose

that by putting the role of self-maintenance central, I can provide a more valid view of the processes that come into play when people read a health message. That is, a self-oriented view makes it possible to explain more phenomena in the domain of health communication and to predict more accurately the effects of health messages.

Health Messages and Self-Threat

Most people value health; health is considered important and people do not wish to become ill or die young (Arndt, Cook, Goldenberg, & Cox, 2007; Persson, Engstrőm, Rydén, Larsson, & Sullivan, 2005). Thus, people have the goal of acquiring and maintaining good health. At the same time, however, many people endanger their own health, for example, by smoking, eating unhealthy foods, doing insufficient physical exercise, or having unsafe sex. Health messages remind people of the health risks they take by acting in certain ways, and they are more or less explicit in holding people responsible for the possible negative health outcomes. This sense of responsibility is implicitly present in all health campaigns; both the cause of the risk and the solution lie in the hands of the individual.

People's unhealthy habits do not match their goal of maintaining good health. Health messages can, therefore, induce the conclusion that one acts in an inconsistent and inadequate way: setting a goal because it is basically important but at the same time violating it. This psychological state causes unpleasant emotions and is conceptualized as a self-threat (Steele, 1988). In general, people are motivated to eliminate this self-threat and to restore a sense of adequacy. Consequently, health messages that stress the negative consequences of unhealthy habits cause a self-threat but subsequently motivate people to restore a sense of self-integrity.

The presence of a self-threat due to confrontation with information that stresses the presence of negative self-inflicted health outcomes and the adaptive reactions this causes are the core of the current doctoral thesis (see Figure 1.1 for the general model). Thus, contrary to what traditional fear appeal theories claim, my position is that fear reduction is not people's core motive in handling a health

message. How people react to health messages can better be explained by people's aim to maintain a sense of self-integrity.

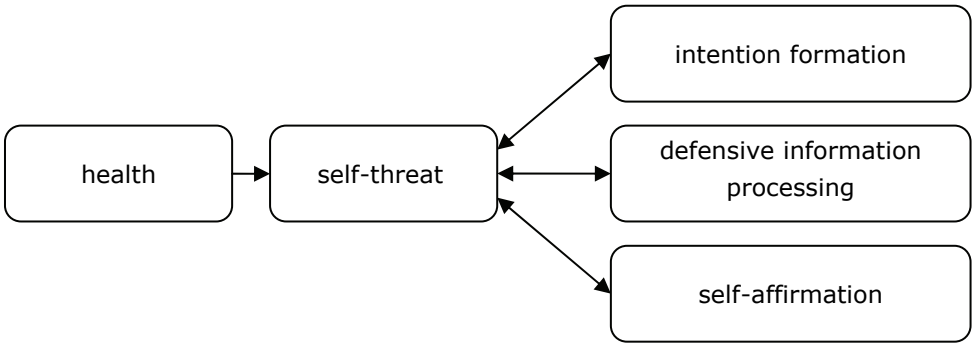

Figure 1.1 Schematic model of the determinants of and adaptive reactions to self-threat in the domain of persuasive health communications.

It is important to note that health outcomes do not necessarily have to be very severe or physically threatening to cause a self-threat. All messages that stress self-inflicted negative outcomes of some sort can cause a self-threat. For example, health messages that stress that insufficient physical exercise causes diabetes, health messages that inform people about hearing damage due to exposure to loud music, as well as messages that stress the increased risk of getting cancer can all lead to a self-threat. The essence is that health messages pinpoint that people violate their own values (i.e., being/staying healthy). This makes people feel stupid for endangering their own health – that is, people's selves are threatened. This negative feeling can be induced by reminding people of mild or serious negative outcomes. Of course, the risk of death and the risk of facing a non-fatal disease can lead to different levels of self-threat, but both have the potential to threaten people's self-integrity.

Self-affirmation Theory (Steele, 1988) states that "cognitions that threaten the perceived integrity of the self […] arouse a motivation to reaffirm the self, to reestablish a perception of global self-integrity" (p. 290). According to Steele (1988), people can display at least three

adaptive reactions to handle the unpleasant feeling induced by a self-threat: 1) people can alter unhealthy habits or form intentions to change unhealthy habits; 2) people can react defensively to the health message; or 3) people can apply self-affirmation (see Figure 1.1). Which option is used to restore their sense of self-integrity depends on the availability and effectiveness of the means.

The first option seems the most straightforward one – that is, adopt the recommendations mentioned in the health message or form an intention to do so (e.g., stop smoking tobacco, or start eating sufficient fruits and vegetables). Although this seems a sensible and effective way of handling a threat, people can have many reasons for not wanting to do it in this way. For example, smokers confronted with a health message that stresses the negative outcomes of smoking tobacco may believe that quitting smoking would not help to give them a more positive feeling – that is, they may believe that altering their habit is not an effective way to handle the self-threat. Or smokers may be so addicted to tobacco that quitting smoking is simply not an available option to handle the self-threat. Therefore, many people seem to handle a self-threat by using the second adaptive reaction; they process the message defensively (e.g., Kunda, 1987; Liberman & Chaicken, 1992). That is, people read the message in a biased way, make counterarguments, or simply deny its truth. This defensive processing prevents people from being fully confronted by information about self-inflicted negative outcomes. Thus, although the information is important to them because it is congruent with the strong value of health, they reject it. Like intention-formation, this option can be ineffective. The threat may be too potent to be suppressed, for example, because the health message is very intense or is repeated time after time.

Self-affirmation Theory (Steele, 1988) states that people can also aim to restore the perceived integrity of the self directly through self-affirmation. In essence, self-affirmation refers to the generation of positive self-images which are unconnected with the threatening event. People can do things to affirm themselves (to generate positive self-images), but in psychological research people can also be affirmed

using experimental manipulations (to generate positive self-images). Manipulations of self-affirmation that are induced in scientific laboratory settings entail activities that make salient important values unconnected with the threatening event, or make people reflect on important aspects of their life irrelevant to the threat (McQueen & Klein, 2006). For example, participants are provided with very positive feedback on a bogus questionnaire about their social skills before reading a threatening health message (Cohen, Aronson, & Steele, 2000). These self-affirmation procedures should make people realize that their self-worth is not determined by the evaluative implications of the immediate situation. The result of self-affirmation is that people become open-minded to the self-threatening information and no longer react defensively to the threatening information (e.g., Sherman & Cohen, 2002, 2006). Thus, self-affirmation makes people focus on valued domains of self-integrity unrelated to the threat. This lowers their need to protect their self-worth by reacting defensively, and makes them more open and realistic.

In sum, people can cope with a self-threat by increasing their intention to act healthy, by defensively processing the information, or by means of self-affirmation. All three options are interactive adaptive motives. This means, for example, that when people have changed their intentions in the direction that averts the negative outcomes, their need for maintenance of self-integrity is satisfied and they are no longer motivated to react defensively or affirm themselves in other ways.

Self-Affirmation and Persuasion

The above theorizing on the basis of Self-affirmation Theory about the three adaptive reactions mainly concerns people's spontaneous reactions to self-threats. For example, a person may be confronted with a health message and cope with the self-threat by buying flowers for his partner to affirm his value of being romantic and considerate, which can be regarded as an adequate social behavior that has the power to restore the self. Thus, self-affirmation as a spontaneous behavior occurs after the threat. The affirmed psychological state may be viewed as a relaxed and open mindset, as the person feels highly adaptive and

adequate. There is no need to strongly regulate the incoming information; "the shields are lowered". In research on persuasion participants are confronted with the health message precisely at this moment when their shields are lowered.

Several studies have been focused on the effects of self-affirmation procedures on persuasion in the domain of health. The expectations about the effects of self-affirmation in persuasion are based on a specific postulate of Self-affirmation Theory (Steele, 1988), namely,

> *"…self-affirming thoughts should make it easier to be objective about other self-threatening information; they should reduce the pressure to diminish the threat inherent in this information. In this way, self-affirming thoughts may be an effective means of reducing thought-distorting defense mechanisms such as denial or rationalization"* (p. 290).

When people are presented with a text that stresses negative health outcomes, this is expected to induce a self-threat that they aim to reduce by reacting defensively. Self-affirmation procedures prevent this defensiveness, by forcing people to be open-minded. Consequently, the expected result of self-affirmation is an increase in persuasion (i.e., people are more inclined to form an intention to adopt the mentioned recommendations). Several researchers found this effect in the domain of health. For example, in a study by Sherman, Nelson, and Steele (2000) female participants read a health message about a link between caffeine consumption and breast cancer. The results showed that adding a self-affirmation procedure made participants more accepting of the information about breast cancer, and they also reported a stronger intention to change their behavior accordingly. In addition, Harris and Napper (2005) showed that self-affirmation increases participants' intention to lower their level of alcohol consumption after being confronted with a health message about the negative consequences of heavy alcohol consumption. There are several more examples of studies

that show similar effects in the domain of health (for overviews, see Harris & Napper, 2005; McQueen & Klein, 2006).

Self-affirmation prevents people from using defensive information processing. This does not mean, however, that the self-threat is trivialized or that people simply become very agreeable (Correll, Spencer, & Zanna, 2004). There are strong indications that self-affirmation makes people painfully aware of the threat. For example, Harris and Napper (2005) found that self-affirmation not only increases people's intentions to change their behavior, but also increases the negative emotions people feel when thinking about the risks of alcohol consumption. Furthermore, Harris, Mayle, Mabbott, and Napper (2007) showed that self-affirmation increased participants' negative thoughts and emotions about smoking. These findings indicate that self-affirmation forces people to acknowledge the physical threat, causing negative emotions. In addition, Dijkstra (2009) showed that self-affirmation led smokers to evaluate themselves more negatively after being confronted with a health message. These data suggest that self-affirmation even forces people to acknowledge their self-threat. I assume that self-affirmation forces people to face the negative outcomes of their actions, whether these are physical outcomes or self-evaluative outcomes. Self-affirmation makes people increasingly aware of the self-threat that is present in a health message by weakening attempts to process health messages in a defensive manner. Or, as Harris and Napper (2005) state, self-affirmation does not lead to threat reduction but to threat acceptance. Consequently, after being self-affirmed people still need to handle the resulting self-threat is some way.

As mentioned above, intention-formation to cope with the threat is one frequent response that has been observed following a self-affirmation manipulation. However, the awareness of the threat may become too strong to accept when the self-affirmation manipulation weakens all remaining defensive emotion-regulation processes. In that case, another defensive reaction may occur. Such a defensive reaction may be observed as a low intention to change. Thus, depending on the

initial level of the threat, a self-affirmation procedure may lead to a higher or to a lower intention. In both cases, I assume that the forced open-mindedness is the cause. Logically, open-mindedness can only be induced when there is some level of closed-mindedness or defensiveness, or some other means of motivated regulation of the processing of information. Thus, a self-affirmation procedure is a diagnostic for the presence of self-related defensive processing or otherwise self motivated regulation of information processing.

General Overview

The current doctoral thesis focuses on the way people handle self-threats in the domain of health communication. In four chapters I will apply a self-integrity maintenance view (see Figure 1.1) to improve understanding of the processes that come into play when participants read a health message. Self-affirmation is used in all studies. The health messages that are used in the presented studies solely concern the physical risks associated with specific health behaviors. Self-threats in the domain of health communication will be investigated in three different ways. First, I will examine the influence of a moderator that determines the extent to which the information is related to people's self, namely, involvement. That is, it will be examined how involvement in the domain of health influences the way people handle a self-threatening health message (Chapters 2 and 3). Second, I will investigate how individuals differ in their inclination to spontaneously think about positive self-images (cognitive self-affirmation inclination) when confronted with a health threat (Chapter 4). Third, I will focus on a specific health threat frequently mentioned in health messages, namely, cancer (Chapter 5). Self-affirmation is used as a diagnostic tool that helps to identify the ways people cope with the self-integrity threats induced by a health message.

The current chapter provides an overview of the following four chapters in this doctoral thesis and the 11 studies (1 cross-sectional study and 10 experimental studies) that I conducted. The chapters are divided in three parts. The first part concerns the interplay between self-threat

and involvement, the second part concerns individual differences in self-affirmation, and the third part concerns a specific health outcome, namely, cancer. Before discussing the different studies in the current doctoral thesis, I describe previous research outcomes and existing theoretical ideas pertaining to each of the three parts. These findings show what has already been done, what is known about self-threat and self-affirmation, and which questions have been left unanswered.

Part 1: Health Messages and Involvement

Two types of involvement are of primary importance in the context of persuasive communication: value-involvement and outcome-involvement (Johnson & Eagly, 1989). Value-involvement is defined as the association between the topic of a persuasive message and a person's important values. For example, in the domain of health, a message on the negative consequences of unhealthy foods may relate to a person's health values. To the extent that the person's self-image or self-defining values include gaining and maintaining good health, this person is highly involved in the topic of the message. Another type of involvement is outcome-involvement. This is defined by the association between the topic of the persuasive message and a person's current goals or outcomes. In the context of health messages, this means that a threatening health message does or does not apply to a person because of an objective relation between health outcomes and behavior (e.g., a message about testicular cancer is not relevant to a female recipient). Thus, outcome-involvement concerns the objective importance of a topic to an individual, but is less necessarily or centrally related to the self (Eagly, 2007). That is, outcome-involvement does not concern people's core values and, therefore, people's selves are less directly involved.

Owing to the different natures of the two types of involvement, they are expected to have opposite influences on the reactions of people to a threatening health message. Value-involvement concerns people's core and self-defining values; messages that threaten these values are too threatening to accept, thus people react defensively. Outcome-involvement does not concern people's selves so directly,

which makes it possible for people to accept the message. Thus, the two types of involvement relate to a different extent to people's selves and, therefore, arouse different responses. So far, no research has been done in the field of persuasive health communication that was explicitly aimed at disentangling the influences of the two types of involvement. In the studies reported in Chapter 2 the effects of both types of involvement are compared; in Study 3 I focus on the role of value-involvement, and two types of health behaviors are contrasted. In addition, the findings reported in Chapter 3 show whether the lowering of immediate defensive reactions to a health message, caused by a self-affirmation procedure, translates into actual behavior after one month.

Part 2: Individual Difference in Self-Affirmation

In everyday life people are often confronted with self-threatening health messages, but they have many options at their disposal to affirm themselves. For example, they can buy flowers for their partner to affirm their value of being romantic and considerate. Or they can invite their handicapped neighbor for dinner to affirm their value of being sociable and generous. These options for self-affirmation are behavioral in nature. However, I expect that people can also affirm themselves cognitively. That is, people can have access to positive self-restoring images in the absence of a self-affirmation procedure (McQueen & Klein, 2006). This cognitive self-affirmation option should, like self-affirmation manipulations, force people to open-mindedly acknowledge health messages.

In the literature, several theories focus on people's aim to maintain a positive self-image (for an overview, see Tesser, Crepaz, Collins, Cornell, & Bach, 2000). However, the explicit focus is mainly on the underlying mechanisms that may lead to this positive self-image. The most important model is Tesser's (1988) Self-esteem Maintenance Model. This model emphasizes the social means that people can use to maintain self-integrity – that is, social comparison is the underlying mechanism to create positive self-images. In the current doctoral thesis I, however, focus directly on the spontaneous use of existing positive self-images.

I assume that people vary in the extent to which they have access to positive self-images. It is as yet unclear how individual differences in such "self-resources" can be measured. The reason why so little is known about this individual tendency can be traced back to the fact that little consensus exists about the underlying mechanism that makes self-affirmation effective. Although self-esteem is frequently mentioned as the underlying mechanism, a systematic review of self-affirmation emphasizes the inconsistent and fluctuating relationship between self-affirmation and self-esteem (McQueen & Klein, 2006). In unraveling the nature and existence of people's potential cognitive self-affirmation inclination in the present studies, self-esteem is taken into account.

The aim in Chapter 4 is to construct a scale to measure people's cognitive self-affirmation inclination. I propose that the essence of this inclination is the automatic retrieval and consideration of important self-images (e.g., Steele, Spencer, & Lynch, 1993). More concretely, it can be defined as the inclination to react with "pop-ups" of positive self-images in the face of self-threats. The automatic character of this tendency does not prevent people from having access to the outcome of the processes. This is in line with findings in the field of social comparison research; social comparison is also known for its automaticity, but in measuring this concept people can be asked some direct questions in order to infer their individual comparison tendencies (Gibbons & Buunk, 1999). Accordingly, I ask people to report their experienced relative frequency of "pop-ups" of positive self-images. Examples of questions in the measurement of cognitive self-affirmation inclination are: "I notice that I did some things very well" and "When I feel bad about myself, I think about all the things that I can be proud of." People who indicate that they have these experiences frequently, are expected to react in line with this inclination when they are confronted with information comprising a (potential) self-threat.

Part 3: Health Messages and Cancer

The health outcomes mentioned in persuasive messages differ greatly. Some health campaigns concern mild diseases, like the flu. Others concern chronic diseases, like diabetes. However, a large number of

health campaigns refer to fatal outcomes. A disease that is frequently mentioned is cancer. Cancer is related to several lifestyle behaviors, such as tobacco smoking and alcohol consumption, and roughly half of the people who are diagnosed as having cancer will die from it (Brenner, 2002). Thus, there is a strong objective link between cancer and death. In Chapter 5 I focus on this specific health outcome.

A theory that is relevant when considering death is Terror Management Theory (based on the work of Ernest Becker, 1971, 1973). This theory is based on the premise that humans are in a precarious position owing to the conflict between biological motives to survive and the cognitive capacity to realize life will ultimately end. This generally unconscious awareness that death is inevitable, coupled with the proclivity for survival, has the potential to create paralyzing anxiety. Terror Management Theory suggests that people have defense mechanisms that prevent them from experiencing the anxiety that this awareness engenders.

Arndt et al. (2007) recently focused on the link between cancer and death. They showed that reminders of cancer instigated a fiercer suppression of death-related thoughts than did reminders of mortality. The construct of death is probably more abstract than the construct of cancer. The latter may more strongly activate the memory network relating to death, owing to the associations of cancer with the process of dying, suffering, and the ultimate farewell in the social context. The studies reported in Chapter 5 focus on the link between cancer and death-related thoughts. More specially, I focus on the extent to which participants display suppressive tendencies when reminded of cancer. The aim is to show that perceptions of cancer are crucial to the way people handle death-related cognitions. Two types of associations are central: the treatability of cancer and the ability to prevent cancer. These associations are expected to influence the link between cancer and death, and consequently people's suppressive reactions.

Overview of the Empirical Chapters

The general theoretical ideas pertaining to the three lines of research on self-threat in the domain of health communication are outlined above;

below is a summary of the structure and content of the empirical chapters.

Health Messages and Involvement

Chapter 2 describes an examination of the extent to which type and level of involvement determine people's responses to a health threat. In Study 2.1 value-involvement was manipulated, in Study 2.2 outcome-involvement was manipulated. Self-affirmation was manipulated in both studies to unravel the underlying defensive processes.

Chapter 3 reports on an experimental study with an immediate outcome assessment and a four-week follow-up. The main question is whether the elimination of an immediate defensive reaction towards a health message, owing to the addition of a self-affirmation procedure, can still be observed in participants' behavior after four weeks. Thus, I investigate whether the open-mindedness caused by a self-affirmation procedure results not only in increased intentions but also in actual behavior. In order to generate defensiveness, value-involvement was included as individual difference measured at pretest. The health message concerned the negative consequences of insufficient fruit and vegetable intake. To show that defensiveness occurred, a self-affirmation procedure was used. After reading the health message participants immediately reported their intention to eat sufficient fruits and vegetables. One week and four weeks later, participants were asked to complete self-reports of fruit versus vegetable intake.

Individual Differences in Self-Affirmation

Chapter 4 focuses on the question whether people can affirm themselves. In four studies I test a scale to measure people's cognitive self-affirmation inclinations and to take the first steps in validating this scale. Study 4.1 was a cross-sectional study among smokers and was aimed at showing that cognitive self-affirmation inclination is related to perceptions of negative outcomes in a different way than self-esteem. In Study 4.2 I investigated the test-retest stability and the construct validity of cognitive self-affirmation inclination scale. In Study 4.3 the aim was to determine whether self-generated positive self-images

increase persuasion in the same way as self-affirmation manipulations do. In Study 4.4 I considered the combined effect of cognitive self-affirmation inclination and a self-affirmation manipulation. The aim of the design was to show whether a strong cognitive self-affirmation inclination satisfied participants' need for positive self-images in the presence of a health threat; when people already have positive self-images available, a self-affirmation procedure should have no effect anymore.

Health Messages and Cancer

The studies reported in Chapter 5 focus on how people handle a confrontation with the threat of cancer. I look at the extent to which people have death-related thoughts when reminded of cancer. The number of death-related thoughts is considered to be a measure of the accessibility of the associative memory network for death. The main question here is whether people's perceptions of cancer influence the number of death-related thoughts when they are reminded of cancer. In Study 5.1 the effects of cancer primes were compared with the effects of general death primes. In Studies 5.2 and 5.4 I looked at the influence of perceptions about the treatability of cancer. In Study 5.3 treatability was manipulated, and I explored perceptions of the preventability of cancer. In Study 5.1, self-affirmation was included as an individual difference (cognitive self-affirmation inclination); in Studies 5.2, 5.3, and 5.4, self-affirmation was manipulated. In addition, in Study 5.4 the effects of the perceptions pertaining to cancer were studied by applying a subliminal cancer prime.

Note that all the chapters are written in such a way that they can be read independently. As a consequence, there is some overlap between parts of the chapters. The empirical chapters in this doctoral thesis (Chapters 2-5) are based on collaborative research by me and others. Therefore, in those chapters, "we" instead of "I" is used when referring to the authors.

Chapter 2. Differential Effects of Self-Affirmation in Persuasion: The Role of Value-Involvement Versus Outcome-Involvement[1]

[1] This chapter is based on Pietersma, S., Dijkstra, A., & Buunk, A. P. (2009). *Differential effects of self-affirmation in persuasion: The role of value-involvement versus outcome-involvement.* Manuscript submitted for publication.

The aim of most health promotion campaigns is to change people's perceptions of a specific unhealthy behavior with the ultimate aim of changing their behavior. In order to motivate people to adopt healthy lifestyles, health educators present them with information stressing an individual's vulnerability to a health risk, the severity of this risk, or both. This message is then followed by a recommendation in which a solution to the health risk is presented. Being reminded of the negative self-inflicted health risks may induce the conclusion that one's actions are inconsistent and inadequate. This psychological state can be conceptualized as a self-threat (Dijkstra & Buunk, 2008; Steele, 1988; Stone & Cooper, 2001). This undesired state may motivate people to process the threatening information defensively (e.g., Kunda, 1987; Liberman & Chaiken, 1992). *Self-affirmation procedures* can influence this reaction to self-threatening information. It is unclear, however, under what terms a self-affirmation procedure enhances the persuasive impact of the message. The present research aims at specifying the conditions that determine whether and when self-affirmation leads to less persuasion or more persuasion. The central idea is that the type of involvement (value versus outcome) and level of involvement (weak versus strong) in the topic of the persuasive message determine whether self-affirmation has a moderating effect.

Self-Affirmation Procedures and Persuasion

Self-affirmation involves thinking about one's "sustaining valued self-images" (Steele, 1988, p. 291). Such self-affirmations refer to engaging in activities that make salient important values unconnected with the threatening event, or reflecting on important aspects of one's life irrelevant to the threat (McQueen & Klein, 2006). For example, participants are provided with positive feedback on an important skill (Cohen, Aronson, & Steele, 2000). According to Steele (1988), people are motivated to maintain a self-image that is moral, adaptive, and capable. This motive is activated by threatening health messages. One way to maintain that positive self-image is by processing the threatening information in a defensive manner. Research has shown that a self-affirmation procedure can reduce the need to respond

defensively (e.g., Harris & Napper, 2005). Self-affirmation procedures make people focus on domains of self-integrity unrelated to the threat, making them realize that their self-worth is not determined by the evaluative implications of the immediate situation. This results in a more open approach to self-threatening information and less need to distort or reconstruct the threatening information (e.g., Sherman & Cohen, 2002, 2006). Thus, self-affirmation procedures provide people with the strength to face up to what the message means for them affectively (Harris & Napper, 2005).

The main focus of self-affirmation research is on showing the positive effects of self-affirmation on persuasion (e.g., Sherman & Cohen, 2006). For example, Harris and Napper (2005) showed that self-affirmation leads to a higher intention to comply with the recommended alcohol consumption. However, few theoretical ideas or studies have concentrated explicitly on the possible ineffectiveness of self-affirmation in the domain of health (Galinsky, Stone, & Cooper, 2000). This is striking because there are clear indications that self-affirmation does not always enhance persuasion. Some study findings have shown that self-affirmation increases defensive responses to health threats (Boney-McCoy, Gibbons, & Gerrard, 1999) and decreases intentions to act according to recommendations (Reed & Aspinwall, 1998). In addition, some studies have shown that self-affirmation can also have no influence at all on persuasion. For example, Fry and Prentice-Dunn (2005) found no effect at all of the self-affirmation procedure on intention to adopt breast self-examination as a monthly habit. In addition, Dillard, McCaul, and Magnan (2005) showed that a self-affirmation procedure did not lead to an increased acceptance of risk information for smokers. Thus, it can not be said that self-affirmation always leads to more persuasion.

In sum, self-affirmation can have divergent effects. In unraveling these effects, we take a closer look at the role of involvement in the topic of persuasion. Previous research has shown that involvement in the topic of persuasion determines whether or not information is processed defensively (e.g., Ditto, Scepansky, Munro, Apanovitch, & Lockhart, 1998; Kunda, 1987; Morris & Swann, 1996). Because self-

affirmation procedures prevent defensive processing, these procedures can only be effective when some type of defensive processing is present. Therefore, much research on self-affirmation takes into account people's level of involvement (for overviews, see Harris & Napper, 2005; McQueen & Klein, 2006).

Types of Involvement and Defensiveness

We focus on two frequently distinguished types of involvement, namely value-involvement and outcome-involvement (e.g., Eagly, 2007; Johnson & Eagly, 1989). Value-involvement is defined by the association between the topic of a persuasive message and a person's important values. For example, in the domain of health, a message on the negative consequences of eating unhealthy foods may relate to a person's health values. To the extent that the person's self-image or self-defining values include gaining and maintaining good health, this person is highly involved in the topic of the message. Thus, high value-involvement concerns the strong subjective importance of a topic. Another type of involvement is outcome-involvement (Johnson & Eagly, 1989). This is defined by the association between the topic of the persuasive message and the person's current goals or outcomes. For example, a message about visiting hours in university dormitories is very relevant to students of that university (high outcome-involvement), but not to students at another university (low outcome-involvement) (e.g., Petty & Cacioppo, 1986). Thus, outcome-involvement concerns the objective importance of a topic to an individual; it is less centrally related to the self (Eagly, 2007).

Owing to the different natures of the two types of involvement, they are expected to have opposite influences on people's reactions to a threatening health message. Value-involvement concerns people's core and self-defining values; messages that threaten these values are too threatening to accept, thus people react defensively. Outcome-involvement, however, does not concern the self so directly, which makes it possible for people to accept the message. As Eagly (2007) stated, "Outcome-involvement […] arouse(s) reality-seeking responding" (p. 68). The two types of involvement relate to a different

extent to people's selves, and thus arouse different responses. In accordance, some research findings showed that high levels of value-involvement induce resistance to persuasive messages (e.g., Zuwerink & Devine, 1996), while high levels of outcome-involvement lead to increased persuasion and no defensive responses (e.g., Johnson & Eagly, 1989).

As mentioned above, self-affirmation is only effective when people display defensive tendencies. Accordingly, only when value-involvement is considered, is self-affirmation expected to influence the persuasive strength of a health message. Therefore, in most studies focused on self-affirmation in the domain of health communication, researchers aimed to include value-involvement in their research design. In all these studies, level of involvement was measured by determining how relevant a message was to participants. For example, participants were presented with a text about a link between caffeine consumption and fibrocystic disease (this is a precursor to breast cancer). High levels of caffeine consumption are supposed to be an indication of high involvement (e.g., Sherman, Nelson, & Steele, 2000; Reed & Aspinwall, 1998). Other studies were focused on the link between smoking and cancer. People who smoked cigarettes were the high relevance group, and non-smokers or light smokers the low relevance group (e.g., Dillard et al., 2005; Harris, Mayle, Mabbott, & Napper, 2007). Others considered high levels of alcohol consumption or being sexually active as indicators of high levels of value-involvement (e.g., Harris & Napper, 2005; Klein, Blier, & Janze, 2001). The question is, however, whether people's levels of value-involvement were really captured as assumed in all these studies (Sherman et al., 2000).

In the above-mentioned studies, the level of involvement was determined by looking at participants' objective behavior (e.g., you smoke thus the message applies to you). Type and level of involvement were thus not manipulated, but based on pre-existent individual differences in behavior. It is possible, therefore, that although a message was objectively relevant, people still perceived the message as unimportant. That is, within a constructed high value-involvement group, people may differ in how personally relevant they perceive the

message to be. Thus, personal beliefs may confound the effects in the low and high involvement groups, which may cause people to feel involved in the low involvement group and vice versa. Owing to the use of objective standards in the studies, it could be reasoned that not value-involvement, but outcome-involvement, was measured. However, the claim that outcome-involvement was actually measured in some of the studies mentioned poses a new problem. That is, many health behaviors can not validly be considered dichotomous. For example, in the case of coffee consumption, fat consumption, fruit and vegetable consumption, physical exercise, and hours of sleep, all people engage in the behavior at least to some extent. It remains unclear what cutoff point should be used to objectively construct a low outcome-involvement group versus a high outcome-involvement group. In sum, in all studies, it is possible that either value-involvement or outcome-involvement, or a mixture of both, was in play. This inconsistency in the way involvement was measured provides a possible explanation why self-affirmation leads to divergent effects. As stated above, it is expected that only when value-involvement is exclusively considered will self-affirmation have an effect, and not when outcome-involvement is considered. Because unconfounded ways of measuring involvement were not used, it is possible that outcome-involvement was captured in some studies. Consequently, no effects of self-affirmation should be found.

Our way of reasoning remains speculative and inconclusive. In the current research, therefore, we explicitly manipulate level (weak versus strong) and type of involvement (value-involvement and outcome-involvement). As a result of using manipulations we are able to examine the influence of involvement in a stricter and unconfounded way. Our central position is that type and level of involvement will determine how people handle a threatening health message, and this will determine whether or not self-affirmation procedures will have an effect on persuasion. In short, we expect that self-affirmation will only enhance persuasion when defensive processes are present; thus, when value-involvement is concerned.

Involvement and Self-Restorative Actions

What kinds of effects can be expected of self-affirmation when value-involvement is concerned? Value-involvement concerns the association between the topic of a persuasive message and one's important values (e.g., Eagly, 2007; Johnson & Eagly, 1989). In the current research we look at the topic of health and thus also the value people attach to health. As indicated by Eagly (2007), value-involvement induces defensive reactions. Self-affirmation eliminates defensiveness and forces people to be open-minded (Steele, 1988). However, the level of value-involvement determines the extent to which a health message induces a self-threat, and also the effect of self-affirmation. When it comes to the effects of a self-affirmation procedure, there are three possibilities. First, when people attach low value to health, it is plausible that they do not experience a self-threat when confronted with the health threat. Because they do not value health outcomes greatly, self-inflicted negative health outcomes do not indicate a strong relevant inconsistency or inadequacy. Therefore, no defenses are raised and a self-affirmation procedure will have no effect. However, most people do value health to some extent (e.g., Solomon, Greenberg, & Pyszczynski, 2004). For this reason, we did not include this level of involvement in the current research. Second, when people value health, as most people do, but not as a top priority, they experience a self-threat that leads to defenses (for an overview, see Levin, Nichols, & Johnson, 2000). That is, these people may acknowledge the importance of health and they may be aware that unhealthy behavior is inconsistent with this value, but at the same time they may have values that prevent them from making health their top priority. For example, a smoker may value health but at the same time value the desired effects of smoking. This person will experience a self-threat, but will not restore his or her self-integrity by changing the unhealthy behavior. Instead, this person may wish to preserve the unhealthy behavior and become defensive in order to restore the self; this can be prevented using a self-affirmation procedure. In this case, self-affirmation will have an effect; it is expected to increase intentions compared to no self-affirmation. Third, people may value health very highly; health is their top priority. In that

case, persuasive information that confronts them with possible negative outcomes is in line with their top priorities in life (Brunstein, 2000; Brunstein & Gollwitzer, 1996). Research has shown that a value that is top priority results in a strong commitment that forces people to attain this desired identity (Brunstein & Gollwitzer, 1996), and does not lead to defensive or biased responses. People may experience a self-threat, but instead of reacting defensively they take the opportunity to form intentions in the advocated direction. Because no defenses are raised, self-affirmation will not make a difference. In sum, especially in people who value health, but not so much that they are willing to do everything and take every opportunity to protect or improve it, defensive reactions might be expected. Adding self-affirmation is thus expected to increase persuasion.

Research has shown that when outcome-involvement is concerned no defensiveness is present towards the persuasive appeal (e.g., Johnson & Eagly, 1989). Self-affirmation procedures are known to eliminate defensiveness. Thus, our primary expectation is that self-affirmation procedures will not have any influence on the persuasive strength of the health messages when outcome-involvement is concerned. We expect that participants with strong outcome-involvement will have the most salient threat. They will deal with this increased threat using problem-focused responses aimed at progressing towards their goal of leading a healthy life; thus, they will show increased intention to change their behavior in accordance with the recommendations in the health message.

Overview of Studies

The present studies address the question whether and how type and level of involvement have a moderating influence in the context of self-affirmation and persuasive health communication. In both studies, the message consists of a text about the negative physical consequences of eating insufficient amounts of fruits and vegetables. The self-affirmation procedure consists of positive bogus feedback on a test, which is said to predict future success in work and social relationships (Schwinghammer, Stapel, & Blanton, 2005). In Study 2.1, value-

involvement is manipulated; in Study 2.2, outcome-involvement is manipulated. The effects of exposure to health messages are assessed using a commonly used outcome measure in persuasion research: the intention to change the unhealthy behavior according to the recommendations.

Study 2.1

In Study 2.1 the role of value-involvement was examined; that is, the subjective relevance of a health message was central. In short, we manipulated value-involvement by having participants read about the importance of health. Half of the participants read that health is a top priority (high value-involvement); others read that health is important but not the most important thing in life (moderate value-involvement). We expected a moderating role of value-involvement in the context of self-affirmation and persuasive health messages. Only for participants who were moderately involved did we expect an effect of self-affirmation; such people display defensive reactions, and thus affirmation was expected to have an influence. For highly involved participants we expected no effect of self-affirmation.

Method

Participants and Design

One-hundred-and-thirty students (98 women, 32 men) of the University of Groningen participated in exchange for partial course credit or 5 euro. The average age was 20.55 years (*SD* = 4.28). Participants were randomly assigned to one of four conditions of a 2 (no self-affirmation vs. affirmation) x 2 (value-involvement: moderate vs. high) between-subjects design.

Procedure

After being welcomed to the laboratory (individual cubicles), the participants were told they were going to participate in a series of supposedly unrelated studies. All measurements were conducted using computer. Before the participants were exposed to any manipulation, some pretest measurements were taken. Next, participants were

exposed to the value-involvement manipulation; they were asked to read a text about the importance of health. The participants were then presented with the self-affirmation manipulation. Participants in the affirmation condition were presented with a test which supposedly mapped their social and work-related skills. At the end they were presented with a very positive score on the test. The participants in the no-affirmation condition were asked to unscramble the names of twenty animals. Next, all participants read a text about the consequences of insufficient fruit and vegetable intake. All participants then completed the dependent measurements. Finally, the experimenter debriefed the participants.

Materials and Measurements

Pretest measurements. First, participants were asked some general demographic questions (e.g., gender, age). Next, two questions were asked about participants' intentions to eat sufficient fruits and vegetables; "In the next three months, I am planning to eat the daily recommended amount of fruits and vegetables" (endpoints 1 [*certainly not planning this*] and 5 [*certainly planning this*]) and "In the next three months, it is likely that I will eat the daily recommended amount of fruits and vegetables" (endpoints 1 [*certainly not likely*] and 5 [*certainly likely*]). We created a composite measure (r = .74, M = 3.55, SD = 1.10).

Value-involvement manipulation. Participants were asked to read a text about health. It was supposedly an article from a regional Dutch newspaper, and it described the opinion of a physician about the importance of health. They were told that the aim was to determine their opinions about the article. The text consisted of one page of about 200 words. In the 'moderate value-involvement condition' participants were told that health is important but not top priority. This statement was made four times in the text. It was said that health is not something people are continuously aware of, and that health is not something that people spend most of their time and energy on. Two examples were mentioned to underline these statements: 1) many people who bike do not have appropriate lighting and 2) in traffic

people care more about arriving on time than about their safety (both examples are typical of the situation in the Netherlands).

In the "high value-involvement condition" participants were told that health is top priority. This statement also occurred four times in the manipulation. It was underlined that health determines people's freedom of movement and that health is essential to people's lives. Again, two examples were mentioned to underline these statements: 1) before crossing a street people always pay attention to other traffic and 2) people take many precautions to prevent harm, like fire precautions and traffic safety measures.

Self-affirmation manipulation. The participants were asked to complete a test, which was said to reliably predict future success in work and social relationships. Participants were presented with ten statements (e.g., "I would rather not be responsible for other people") and were asked to indicate to what extent these statements applied to them (endpoints 1 [*not at all like me*] and 5 [*very much like me*]). In the self-affirmation condition, participants were affirmed by immediately receiving positive bogus feedback on their test. Next, they were asked to write down why they thought their score was so high. Participants who did not undergo the self-affirmation procedure were given a puzzle task; they unscrambled the names of twenty animals.

Threat manipulation. Participants were presented with a text about the negative consequences of eating less than the daily recommended amount of fruits and vegetables. The article was supposedly published in a scientific journal. The participants were told that the aim of the study was to determine their opinion about the article; therefore, they would be asked some questions about the article. Participants were presented with a text of four pages, each on a different screen, through which they could leaf (total of 620 words). First, the relations between fruits and vegetables, free radicals, and the immune system were addressed. Second, it was made salient that students who eat unhealthily have a higher risk of acquiring a variety of diseases (e.g., the flu and bone cancer). In addition, the participants were shown pictures with possible symptoms of four diseases: fever, diabetes type II, skin cancer, and a tumor.

Dependent measurements. Two questions were used to assess participants' intention to increase their daily fruit and vegetable intake; "It is likely that I will start within the next six months with a nutritious diet in which I will take the daily recommended amount of fruits and vegetables" (endpoints 1 [*certainly not likely*] and 7 [*certainly likely*]) and "I am prepared to start within the next six months with a nutritious diet in which I will take the daily recommended amount of fruits and vegetables" (endpoints 1 [*certainly not prepared*] and 7 [*certainly prepared*]). A composite measure was created for intention (r = .66, M = 5.37, SD = 1.33).

To check the effectiveness of the value-involvement manipulation we asked participants, immediately after the value-involvement manipulation, whether they agreed with the following statement "Health is a top priority to me" (endpoints 1 [*not top priority*] and 7 [*top priority*]). The effectiveness of the self-affirmation manipulation was also assessed. Participants were asked whether the SFAI task/puzzle task gave them a good feeling about themselves (endpoints 1 [*absolutely no positive feeling*] to 7 [*very positive feeling*]).

Results and Discussion

Manipulation Check

A one-way ANOVA was conducted to test whether the value-involvement manipulation was effective. As intended, the results show that participants who read a text about health being a top priority in life also indicated that they perceived health as significantly more important (M = 4.94, SD = 1.59) compared to participants who read a text that portrayed health as moderately important (M = 4.25, SD = 1.46), $F(1, 128) = 6.53$, $p < .05$, $\eta_p^2 = .05$. In addition, we examined the effectiveness of the self-affirmation manipulation. A one-way ANOVA showed a significant main effect of the self-affirmation manipulation; we found that self-affirmation gave participants a better feeling about themselves (M = 5.73, SD = 1.07) compared to the puzzle task (M = 4.75, SD = 1.19), $F(1, 128) = 24.74$, $p < .01$, $\eta_p^2 = .16$.

Value-Involvement as a Moderator of the Effect of Self-Affirmation

The moderating effect of value-involvement on the effect of self-affirmation was tested. Two-way analysis of covariance was performed (ANCOVA), with self-affirmation manipulation and value-involvement manipulation as independent variables. Intention measured at pretest was included as covariate. We found a significant main effect of value-involvement on intention to eat fruits and vegetables, $F(1, 125) = 3.79$, $p = .05$, $\eta_p^2 = .03$. Participants who were highly involved had a stronger intention to eat sufficient fruits and vegetables ($M = 5.49$, $SE = 0.09$) than did moderately involved participants ($M = 5.24$, $SE = 0.09$). In addition, we found a significant main effect of self-affirmation; participants who were affirmed reported a stronger intention ($M = 5.58$, $SE = 0.09$) than did non-affirmed participants ($M = 5.15$, $SE = 0.09$), $F(1, 125) = 11.05$, $p < .01$, $\eta_p^2 = .08$.

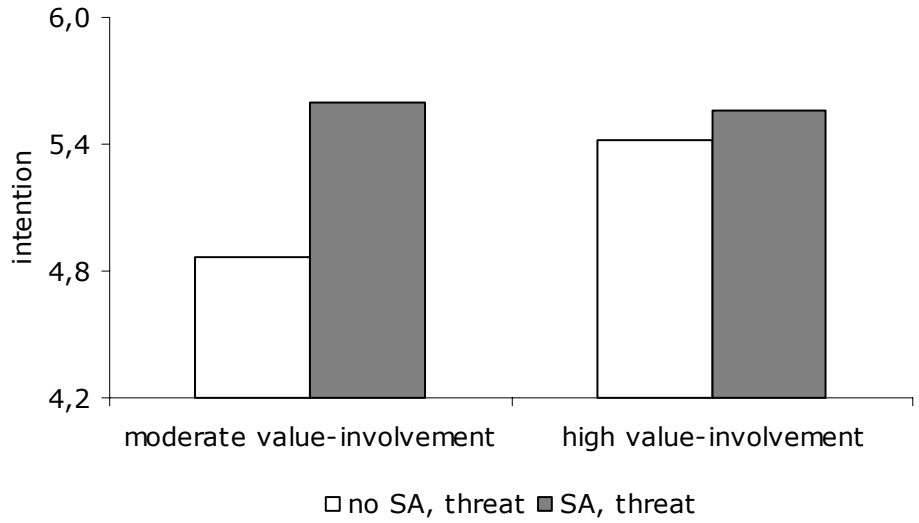

Figure 2.1 Intention to eat the daily recommended amount of fruits and vegetables as a function of self-affirmation and value-involvement, Study 2.1.

Most importantly, we found a significant interaction effect between value-involvement and self-affirmation, $F(1, 125) = 5.08$, $p < .05$, $\eta_p^2 = .04$. Only for moderately involved participants did we expect self-affirmation to increase intention to eat fruits and vegetables. The simple slopes analysis confirmed the hypothesis that adding a self-affirmation procedure resulted in a stronger intention ($M = 5.60$, $SE = 0.13$) compared to no-affirmation ($M = 4.87$, $SE = 0.13$), $F(1, 125) = 15.39$, $p < .01$, $\eta_p^2 = .11$. For participants who were induced to regard health as a top priority we expected to find no effect of self-affirmation. The results did not show a significant effect, $F(1, 125) = 0.57$, $p = .45$, $\eta_p^2 = .01$ (see Figure 2.1). The means were as follows: no self-affirmation ($M = 5.42$, $SE = 0.13$) and self-affirmation ($M = 5.56$, $SE = 0.12$).[2,3]

[2] It is possible that level of involvement influenced the level of the threat; thus highly involved participants might perceive the same threatening text as more threatening. To determine whether this was the case we asked participants at posttest to answer two questions about the seriousness of the consequences of insufficient fruit and vegetable intake. First, participants reported how severe the consequences of insufficient daily fruit and vegetable intake could be (endpoints 1 [*not so severe*] and 7 [*very severe*]). Second, participants' affective risk perception was measured: "I feel anxious when I think about the possible consequences of not eating the daily recommended amount of fruits and vegetables" (endpoints 1 [*no anxiety at all*] and 7 [*very anxious*]).

To investigate whether or not value-involvement determines the level of threat felt, we conducted a one-way ANOVA. Value-involvement was the independent variable. The results showed no significant effects of value-involvement on either severity or affective risk perception ($F < 1.5$, *n.s.*). Thus, the value-involvement manipulation had no effect on the level of threat participants perceived.

[3] To be able to correct for the possible influence of objective amount of unhealthy behavior displayed, we posed two questions concerning fruit and vegetable intake at pretest: "Do you eat 2 pieces of fruit daily?" and "Do you eat 200 grams of vegetables daily?" (endpoints 1 [*I eat less than the norm*] and 7 [*I eat more than the norm*]). Both items correlated significantly ($r = .23$, $p < .01$); they were, therefore, combined in a composite measurement ($M = 3.57$, $SD = 1.10$). The significance level of the manipulation checks in Study 2.1 did not differ when we included fruit and vegetable consumption as additional covariate. Neither did the inclusion of fruit and vegetable consumption change the significance level of the moderation analysis mentioned.

Study 2.2

The findings of Study 2.1 show that value-involvement fulfills a key role in the effects of self-affirmation procedures when participants are presented with a threatening text. However, we expected that the results would be unique to this specific type of involvement. In Study 2.2 we concentrated on the role of outcome-involvement (e.g., Johnson & Eagly, 1989). Outcome-involvement concerns the objective relevance of a topic instead of its subjective relevance. In short, we expected only a main effect of outcome-involvement, and we expected to find no indication that self-affirmation influences persuasion. Self-affirmation procedures are known to eliminate defensiveness. We expected that when outcome-involvement was central no defensiveness would be present; thus, when defensiveness was not present a self-affirmation procedure would not have any influence. However, participants with strong outcome-involvement would experience the most pervasive threat, and we expected them to deal with this threat by directly following the recommendations in the message.

Outcome-involvement was manipulated; on the basis of a bogus genetic test, participants were told that they were or were not vulnerable to the consequences of insufficient fruit and vegetable intake. As in Study 2.1, half of the participants were exposed to the self-affirmation procedure, and all were asked to read a text on the negative consequences of insufficient fruit and vegetable consumption.

Method

Participants and Design

One-hundred-and-thirty-six students of the University of Groningen and of Hanze University Groningen (104 women, 32 men) participated in exchange for partial course credit or 5 euro. The average age was 20.67 years (*SD* = 3.13). Participants were randomly assigned to one of four conditions of a 2 (no self-affirmation vs. self-affirmation) x 2 (outcome-involvement: low vs. high) between-subjects design.

Procedure

After being welcomed to the laboratory (individual cubicles), participants were told that they would participate in a series of supposedly unrelated studies. The experiment started with part of the outcome-involvement manipulation, consisting of a bogus saliva test (DNA test). After the test, all participants completed similar pretest measurements as used in Study 2.1. The self-affirmation manipulation followed; this was identical to the one described in Study 2.1. Following this, the results of the DNA test were given to the participants (this was the outcome-involvement manipulation). Next, participants received the same threat manipulation as used in Study 2.1, followed by the dependent measurements. All the measurements were conducted using computer. Lastly, the experimenter carefully debriefed the participants.

Materials and Measurements

Pretest measurements. As in Study 2.1, we first asked some demographic questions (e.g., gender, age). In addition, we asked participants to answer two questions about their intention to eat sufficient fruits and vegetables. The questions were, "I am planning to consume the daily recommended amount of vegetables" and "I am planning to consume the daily recommended amount of fruits" (endpoints 1 [*certainly not planning this*] and 5 [*certainly planning this*]). A composite measurement was created (r = .52, M = 4.13, SD = 0.79).

Outcome-involvement manipulation. To manipulate outcome-involvement in the context of health, participants were given feedback on a bogus saliva test (DNA test). The participants read an explanation of the DNA test in their individual cubicles. Participants were made to believe that a mutation on a specific gene is closely related to health. The text stated that health is for seventy-five percent determined by enzymes, which can be produced by the gene mutation. Having the gene mutation means that eating healthy is not so important, since the body produces the enzymes by itself (low outcome-involvement manipulation). Without the gene mutation, one needs to eat enough fruits and vegetables, because these foods contain substances which

the body needs to make the enzymes. Not having the gene mutation means that a healthy diet is essential for good health (high outcome-involvement manipulation). The participants were informed that the DNA test consisted of chewing on absorbent cotton for fifteen seconds; this would be placed in a medical vial. Next, a special liquid that reacts with saliva would be poured in the medical vial. An indicator strip would make clear whether the participant had the gene mutation or not. For the participants in the low involvement group, if the strip turned blue, this meant that they had the gene mutation. For the participants in the high involvement group, the blue strip meant that they did not have the gene mutation.

After the participants had read the text, the test leader asked them to follow her to another room, where the DNA test was performed. Medical attributes were placed in the room (doctor's jacket, pipette) to make it as convincing as possible. Each participant was asked to chew on a piece of absorbent cotton. The experimenter explained to them that DNA tests take some time; the participants were invited to continue with the rest of the experiment.

Just before the threat manipulation, the test leader informed each participant individually of the result of the DNA test. The medical vial with absorbent cotton, liquid, and indicator strip were shown as proof of the test result. Half of the participants were made to believe that they had the gene mutation: "Your body generates health by itself, it does not matter what you eat" (low outcome-involvement). The other half of the participants were made to believe that they did not have the gene mutation: "Your body does not generate health by itself; therefore, it is very important for you to eat enough fruits and vegetables every day" (high outcome-involvement).

Dependent measurements. As in Study 2.1, we asked participants about their intentions to consume sufficient amounts of fruit and vegetables: "It is likely that within the next six months I will start a nutritious diet in which I will eat the daily recommended amount of fruits and vegetables" (endpoints 1 [*certainly not likely*] and 7 [*certainly likely*]) and "Within the next six months I am planning to start a nutritious diet in which I will eat the daily recommended amount

of fruits and vegetables" (endpoints 1 [*certainly not planning this*] and 7 [*certainly planning this*]). A composite measurement was created for intention (r = .72, M = 5.08, SD = 1.32).

To verify the meaning of our measure of outcome-involvement we included a measurement of vulnerability: "How vulnerable are you to the consequences of eating less than the daily recommended amount of fruits and vegetables?" (endpoints 1 [*absolutely not vulnerable*] and 7 [*very vulnerable*]). The effectiveness of the self-affirmation manipulation was assessed after the intention measurements. We asked participants about their self-feelings: "How high is your self-esteem?" (endpoints 1 [*not at all high*] and 9 [*very high*]).

Results and Discussion

Manipulation Check

A one-way (outcome-involvement: low vs. high) ANOVA was conducted to check the effectiveness of the outcome-involvement manipulation. As expected, the high involvement group perceived themselves as more vulnerable to the consequences of insufficient fruit and vegetable intake (M = 4.35, SD = 1.26) than did the low involvement group (M = 3.27, SD = 1.52), $F(1, 134) = 20.42$, $p < .01$, $\eta_p^2 = .13$. Thus, highly involved participants perceived the consequences of an unhealthy diet as personally more relevant and likely.[4,5]

[4] Two control groups (N = 62) were added to enable us to check the effectiveness of the threat manipulation. The average age was 20.30 (SD = 2.24). Participants were not exposed to threatening information in either group, and they did not undergo a self-affirmation procedure. One group was exposed to the high involvement manipulation, and the other to the low involvement manipulation. Participants in the control condition were given a text about the history of mustard. The text was the same length as that about nutrition habits, and contained some pictures of mustard seeds and mustard plants. To check the effectiveness of the manipulation we again posed questions at posttest to determine severity and affective risk perception. A one-way ANOVA was conducted to test whether the threat manipulation was effective. Condition (no threat vs. threat) was included as independent variable. As expected, the participants who were threatened (M = 4.74, SD = 1.34) perceived the consequences of eating insufficient amounts of fruits and vegetables as more severe than did the participants who were not threatened (M = 4.00, SD = 1.39), $F(1, 196) = 11.99$, $p < .01$, $\eta_p^2 = .06$. Threatened participants also anticipated more negative consequences due to unhealthy habits (M = 2.91, SD

A one-way ANOVA was conducted to test whether the self-affirmation manipulation was effective. Condition (no self-affirmation vs. self-affirmation) was included as independent variable. The self-affirmation manipulation showed the expected effect; self-affirmed participants reported more positive self-feelings (M = 6.40, SD = 1.23) than did the non-affirmed participants (M = 6.00, SD = 1.28). The main effect approached significance, $F(1, 134) = 3.52$, $p = .06$, $\eta_p^2 = .03$.

Outcome-Involvement and Self-Affirmation

The role of outcome-involvement in the context of self-affirmation and persuasive health messages was tested. We conducted a 2 (no self-affirmation vs. self-affirmation) x 2 (outcome-involvement: low vs. high) ANCOVA. Again, intention measured at pretest was included as covariate. The interaction effect was not significant, $F(1, 131) = 0.07$, $p = .79$, $\eta_p^2 = .001$. We also did not find a main effect of self-affirmation, $F(1, 131) = 0.62$, $p = .43$, $\eta_p^2 = .005$. As predicted, we did find a main effect of the outcome-involvement manipulation on intention to eat sufficient fruits and vegetables, $F(1, 131) = 4.30$, $p < .05$, $\eta_p^2 = .03$. The results showed that participants who experienced outcome-involvement had a stronger intention to change their behavior in accordance with the persuasive message (M = 5.41, SE = 0.13) than

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= 1.49) compared to participants in the control condition (M = 2.11, SD = 1.15), $F(1, 196) = 13.98$, $p < .01$, $\eta_p^2 = .07$.

In addition, a two-way ANOVA was conducted to make sure that involvement did not moderate the effects of the threat manipulation; thus, to ensure that the threat manipulation did not have a greater impact on highly involved participants. Condition (no threat vs. threat) and outcome-involvement were the independent variables. The results showed a significant main effect of threat only on severity ($F[1, 194] = 12.71$, $p < .01$, $\eta_p^2 = .06$) and on affective risk perception ($F[1, 194] = 14.56$, $p < .01$, $\eta_p^2 = .07$). Thus, the bogus DNA test had no effect on the amount of threat the participants felt.

[5] A two-way ANOVA was performed to see whether level of threat moderated the effect of the outcome-involvement manipulation. Amount of threat and level of involvement were the independent variables. The results showed only a significant main effect of the manipulation of outcome-involvement on vulnerability, $F(1, 194) = 26.19$, $p < .01$, $\eta_p^2 = .12$.

did participants who experienced no outcome-involvement (M = 5.05, SE = 0.12).[6]

General Discussion

The aim of the present studies was to show that type and level of involvement determine the effects of self-affirmation in the context of persuasive health messages. The two types of involvement relate to a different extent to people's selves and thus arouse different responses; only value-involvement was expected to induce defensive reactions (Eagly, 2007). Consequently, we only expected to find an effect of self-affirmation when value-involvement was manipulated. Accordingly, we found in Study 2.1 that value-involvement had a moderating influence on self-affirmation; in Study 2.2, we did not find an effect of outcome-involvement on self-affirmation. In Study 2.1, we found that self-affirmation only influenced persuasion for participants in the moderate value-involvement condition. When these participants were confronted with a negative health message they reacted defensively and consequently reported a low intention to consume fruits and vegetables. Self-affirmation weakens these defensive attempts and forces people to accept the threat; participants reported increased intentions to eat fruits and vegetables. For participants with a high level of value-involvement the self-affirmation procedure had no effects. The results show that when values are so important, participants handle the self-threat by forming intentions to act more healthily. Thus, adding self-affirmation had no effect, because there were no defensive reactions to be eliminated.

In Study 2.2 we only found a significant main effect of outcome-involvement. We did not find any indication that self-affirmation

[6] As in Study 2.1, we checked whether objective amount of unhealthy behavior displayed influenced the results found in Study 2.2. We posed the same two pretest questions concerning fruit and vegetable intake. Both items correlated significantly (r = .18, p = .01) and were, therefore, combined in a composite measure (M = 3.35, SD = 1.05). The significance level of the manipulation checks and the analysis concerning the dependent variable in Study 2.2 did not change when we included fruit and vegetable consumption as additional covariate.

influences persuasion when outcome-involvement is manipulated. Participants simply handled the (self-)threat by forming intentions to reach their goal of improving their health. These outcomes underline the statement of Eagly (2007) that outcome-involvement induces not defensiveness, but "reality-seeking" responses (p. 68). This means that defensive reactions aimed at handling the threat in an emotion-focused way are not an option, because they provide no realistic attempt to reach the goal of staying healthy. Thus, adding a self-affirmation procedure, aimed at lowering defensiveness, does not have any effect. In sum, the findings of both studies show that self-affirmation is not a tool that should be expected to increase the persuasive impact of health messages in all circumstances. Self-affirmation can only be expected to increase persuasion when people's personal values are in play, because their selves are then threatened so directly that they react by defensively processing the information. However, these values should not be too strong, because when health is a top priority in people's lives they are not inclined to react defensively to a health message to restore their self-integrity. Clearly, using self-affirmation to prevent defensiveness is useless in the absence of defensiveness.

Involvement Concept

By explicitly comparing different types of involvement in the current study, we also shed some light on the findings of previous research on self-affirmation in the field of persuasive health communications. The findings of previous research on self-affirmation show a somewhat messy picture of the role of self-affirmation. Some researchers found no effect of self-affirmation at all (Dillard et al., 2005; Fry & Prentice-Dunn, 2005), while others found that self-affirmation does influences persuasion (e.g., Harris & Napper, 2005). Involvement was included in all studies, but it was never manipulated. Level of involvement was operationalized as the objective validity of the text: people display the behavior; therefore, it applies to them (Harris & Napper, 2005; Sherman et al., 2000). The implication is that this procedure captures value-involvement. However, one could easily argue that the researchers actually looked at the role of outcome-involvement. Thus, it

is possible that different types of involvement were central in each of these studies. The current research findings show the importance of using strict manipulations of involvement. Only when value-involvement is concerned can one expect helpful influence of self-affirmation in increasing persuasion. Thus, the current research findings provide an explanation of why self-affirmation does not always have to be effective. This makes clear that in previous studies in which an effect of self-affirmation was not found, self-affirmation was not necessarily used improperly. It is possible that outcome-involvement was made salient instead of value-involvement.

In order to solely capture each type of involvement, we had to construct manipulations that differed substantially. The two types of involvement refer to different phenomena and thus require manipulations that are not alike in order to induce these different states. Value-involvement refers to people's personal beliefs. We chose not to activate people's own beliefs to induce different levels of value-involvement; for example, by asking participants to complete a writing assignment. A problem with activating people's personal beliefs is that these could function like self-affirmation (i.e., writing about important values) or they might induce cognitive dissonance (i.e., asking people to write down things which contradict their own values and beliefs). In addition, outcome-involvement was manipulated using a DNA test. This rather complicated procedure was necessary to convince people that the health message did or did not objectively apply to them. It was important not to incorporate previous behavior, because this could have been confounded with value-involvement.

Considerations and Limitations

The manipulations used in the current research provide some points of consideration. In previous research, level of involvement was based on participants' behavior. No additional questions or texts were presented to participants. They simply answered questions, for example, about how much coffee they drank and then read a text about the link between coffee and cancer (e.g., Reed & Aspinwall, 2005; Sherman et al., 2000). In the current research, however, we manipulated

involvement by activating it; we did this by providing participants with additional information about the importance of health (value-involvement) or by explaining bodily health (outcome-involvement). Participants were then asked to read a threatening health message. The manipulations of involvement were assumed to activate a certain level of involvement. No such explicit activation was present in previous research. It is possible that this difference created different processes, and thus different outcomes. However, the advantage of our manipulations of involvement is that we did not need to be so concerned about confounding factors.

Another point in which the current research differs from previous research is in the levels of value-involvement included. In Study 2.1 we looked at moderate versus strong levels of value-involvement. We did not include weak value-involvement. This was because most people value health at least to some extent. Most people want to live a long and healthy life, and fear death (e.g., Arndt, Cook, Goldenberg, & Cox, 2007; Solomon et al., 2004). Therefore, making people believe a manipulation that stresses that health is totally irrelevant is difficult. However, in previous research low and high involvement were always considered. Concerning the low involved group, no effects of affirmation were normally found (for an overview, see Harris & Napper, 2005). As we did not include this level of involvement, it is impossible to compare outcomes. In addition, previous researchers mostly reported effects of self-affirmation for people who were highly involved; adding self-affirmation leads to a stronger intention to comply with the recommendations. We found these effects not for the strongly involved participants, but for moderately involved participants. It is possible that the groups that were previously defined as highly involved were actually moderately involved, and that truly highly involved participants were never examined. However, no objective cutoff points exist that state when involvement is low, moderate, or strong. More research is needed to establish objective cutoff points so that research becomes comparable.

In addition, when we looked at the role of outcome-involvement, we considered weak levels of involvement instead of moderate levels of

involvement. The manipulations used in Study 2.2 made it possible to manipulate low outcome-involvement. Also, a moderately involved group is theoretically less interesting when considering outcome-involvement; based on the literature we simply expected a linear relationship between level of outcome-involvement and persuasion. However, to fully comprehend the current findings and to correctly relate them to previous findings, it is important to underline which levels of involvement we included in the current research.

Summary and Conclusion

In the present studies a self-perspective on persuasion was used. The present results are consistent with a growing body of evidence indicating that self-affirmation does not always enhance the amount of persuasion (e.g., Harris & Napper, 2005). However, the presented studies expand on previous approaches in that a self-perspective on persuasion was used to explain these findings. In explaining the effects of self-affirmation, we focused on how the different types of involvement relate to people's values, self-views, and self-defining goals. Given the central importance of the self and self-evaluation in human functioning, the field of persuasive communication may benefit from a more systematic application of self-theories.

Chapter 3. Do Behavioral Health Intentions Engender Health Behavior Change? A Study on the Moderating Role of Self-Affirmation on Actual Fruit Intake Versus Vegetable Intake[7]

[7] This chapter is based on Pietersma, S., & Dijkstra, A. (2009). *Do behavioral health intentions engender health behavior change? A study on the moderating role of self-affirmation on actual fruit intake versus vegetable intake.* Manuscript submitted for publication.

The aim of most health promotion campaigns is to change people's perceptions of a specific unhealthy behavior with the ultimate aim of changing their behavior. In order to motivate people to adopt healthy lifestyles, health educators present them with information stressing an individual's vulnerability to a health risk, the severity of this risk, or both (e.g., Witte & Allen, 2000). This message is then followed by a recommendation in which a solution to the health risk is presented. This recommendation is supposed to lead to behavior change. It appears, however, that people often process the information in a defensive manner in order to restore their emotional balance (e.g., Kunda, 1987; Liberman & Chaicken, 1992). Recent findings have shown a method to prevent this defensive information processing, namely, by the use of self-affirmation procedures. These procedures involve assignments that make people think about cherished values or attributes; these procedures cause an open-minded approach to the threatening health message (for overviews, see McQueen & Klein, 2006; Sherman & Cohen, 2006). For example, research has shown that self-affirmation leads to greater message acceptance and increased intentions to change behavior (e.g., Harris & Napper, 2005). However, many studies have failed to show that this accepting mindset and intention to change behavior lead to actual behavior change (e.g., Harris, Mayle, Mabbott, & Napper, 2007; Harris & Napper, 2005; Reed & Aspinwall, 2005). Only one study, by Epton and Harris (2008), showed that self-affirmation led to actual behavior change (i.e., increased fruit and vegetable consumption a week after reading a health message). That self-affirmation most often was not related to later behavior might be caused by the function of the intentions that follow persuasive messages including a self-affirmation procedure. That is, these intentions may have the function not of planning behavior but of coping with the negative emotions triggered by the persuasive information. The aim of the current study is to test whether intentions, formed after a self-affirmation procedure, predict actual behavior and, thus, can be regarded as real intentions. We aim to answer the question, "Do reactive intentions due to a self-affirmation procedure engender actual behavior change?" By focusing on the link between reactive intentions

and actual behavior, the current study has the potential to generalize previous findings on self-affirmation and intention; it is possible our findings show that the findings of previous experimental laboratory studies on intention have actual meaning because they link to people's actual behavior.

Self-Affirmation and Persuasion

According to Self-affirmation Theory (Steele, 1988), people have a fundamental need to maintain a positive global self-image. Being reminded of negative, self-inflicted health risks could induce the conclusion that one's actions are inconsistent and inadequate. This psychological state can be conceptualized as a self-threat (Dijkstra & Buunk, 2008; Steele, 1988; Stone & Cooper, 2001), which results in psychological discomfort that people are motivated to reduce. A common way to restore one's self-image is by defensively processing threatening information – people reject, avoid, or deny the information presented to them. According to Self-affirmation Theory, however, people can also restore their self-integrity by means of self-affirmation. Self-affirmation refers to engaging in an activity that makes important values unconnected with the threatening event salient, or it involves reflecting on important aspects of one's life that are irrelevant to the threat (McQueen & Klein, 2006). For example, self-affirmed participants in a study by Sherman, Nelson, and Steele (2000) wrote about important values. Self-affirmations satisfy people's motivation to protect their self-worth, which results in an open-minded approach to threatening messages (e.g., Sherman & Cohen, 2006).

The main focus of self-affirmation research, in the context of health interventions, is on showing the positive effects of self-affirmation on persuasion (e.g., Sherman & Cohen, 2006). For example, Harris and Napper (2005) showed that self-affirmation procedures resulted in increased risk perceptions for the presented health risk (i.e., the negative consequences of excessive alcohol consumption). In addition, Sherman et al. (2000) showed that self-affirmation manipulations resulted in a stronger intention to change unhealthy behavior according to the recommendations made in the threatening

message. However, despite these promising effects, there is little evidence that these positive intentions translate into an increase in actual health behavior (Harris et al., 2007; Reed & Aspinwall, 1998). For example, Harris and Napper (2005) found no decrease in alcohol consumption one week or one month later. Only Epton and Harris (2008) found an effect of self-affirmation on actual behavior. These authors found that self-affirmed participants reported increased fruit and vegetable consumption one week after the self-affirmation procedure. In sum, the findings of most studies show that self-affirmation did lead to changes in intentions, but these intentions did not seem to lead to actual behavior. This raises the question of how realistic the intentions formed after self-affirmation are.

Intentions Versus Behaviors

As mentioned above, according to Self-affirmation Theory (Steele, 1988), people experience a self-threat when they are confronted with negative outcomes they inflict on themselves. Reminders of negative self-inflicted outcomes make people feel inconsistent, inadequate, or non-adaptive. Basically, people are intrinsically motivated to restore their threatened self with whatever means they have at their disposal. One way people restore their self is by processing the information in a biased way. Such defensive processing has been shown to be a common reaction to persuasive health messages (e.g., Kunda, 1987; Liberman & Chaiken, 1992). Thus, defensive reactions are one way to restore the self. The findings of several studies have shown that a self-affirmation procedure prevents defensive reactions from taking place (for an overview, see Harris & Napper, 2005). Self-affirmation is thought to induce open-mindedness while the threat to the self remains. Self-affirmed people acknowledge the dangers and risks of their behavior more strongly; they become painfully aware of the negative outcomes (e.g., Harris et al., 2007) and probably of the self-threat (e.g., Sherman & Cohen, 2006). Thus, self-affirmation weakens defensive information processing, and as a result people have been shown to form intentions to change their behavior in the advocated direction (for an overview, see Harris & Napper, 2005).

These intentions may, however, be formed primarily with the function of self-restoration, just like the former defensive reaction, and not so much in order to actually avert the danger. There are indications that when peoples' self-integrity is at stake they try to decrease the negative feeling not by handling the threat itself, but by handling only the negative emotions. For example, Kok, Ruiter, Van Den Hoek, Schaalma, and De Vries (2007) state that people report increased intentions to change behavior as an easy way to handle the uncomfortable feeling generated by the health message. In addition, Arndt, Schimel, and Goldenberg (2003) showed that people engage in self-esteem strivings following a threat to their self-integrity – people report increased intentions to act healthy, simply to uphold their self-esteem. But, again, people do not form an actual intention to change their behavior. The self may now be protected by false intentions aimed at short term relief from the self-threat. These reactive intentions may not be predictive of behavior, because the intentions are only aimed at generating a good feeling. Thus, the reactive intentions are not related to people's behavioral system, and this might be a cause of the intention-behavior gap (Witte & Allen, 2000).

In the current research we aim to answer the question whether self-affirmation procedures create an intention that is predictive of actual health behavior. In answering this question, we confronted all participants with the possible negative outcomes they inflicted on themselves, applied a self-affirmation procedure in half of the participants, assessed the intentions in all participants, and determined whether these intentions predicted later behavior. In addition, involvement in the topic of persuasion was taken into account. Previous research has shown that involvement in the topic of persuasion determines whether or not information is processed defensively (e.g., Kunda, 1987; Liberman & Chaiken, 1992). Because self-affirmation procedures prevent defensive information processing, these procedures can only have an effect on intention when defensive processing is present.

Value-Involvement and Health Behaviors

The findings of many studies in the field of persuasive health communication have shown that involvement in the topic of persuasion influences defensive information processing (e.g., Ditto & Lopez, 1992; Harris & Napper, 2005; Kunda, 1987; Liberman & Chaicken, 1992). Therefore, involvement influences whether self-affirmation will have an effect on intention. In the current research we focused on a specific conceptualization of involvement, namely, value-involvement. Value-involvement is defined as the association between the topic of a persuasive message and one's important values (e.g., Eagly, 2007; Johnson & Eagly, 1989). In the present domain of health, the value of health is central. The extent to which people value health outcomes will determine the extent of the self-threat they experience when they are confronted with (possible) self-inflicted negative outcomes. When it comes to the effects of a self-affirmation procedure, there are three possibilities.

First, when people attach low value to health, it is plausible that they will not experience a self-threat when confronted with possible negative outcomes. Because they do not value health outcomes greatly, self-inflicted negative health outcomes do not indicate a strong relevant inconsistency or inadequacy. Therefore, no defenses are raised and a self-affirmation procedure will have no effect. Secondly, when people do value health, as most people do, but not as a top priority, they will experience a self-threat that leads to defenses (for an overview, see Levin, Nichols, & Johnson, 2000). That is, these people may acknowledge the importance of health and they may be aware that unhealthy behavior is inconsistent with this value, but at the same time they may have values that prevent them from making health their top priority. For example, a smoker may value health but at the same time value the desired effects of smoking. This person will experience a self-threat, but will not restore his or her self-integrity by changing the unhealthy behavior. Instead, this person may want to preserve the unhealthy behavior and become defensive in order to restore the self; this can be prevented by a self-affirmation procedure. In this case, self-affirmation will have an effect; it is expected to increase intentions

compared to when there is no self-affirmation. Thirdly, people may value health very highly; health is their top priority (e.g., Solomon, Greenberg, & Pyszczynski, 2004). For people who perceive health as a top priority in life, the topic will be connected with self-defining goals (Brunstein, 2000; Brunstein & Gollwitzer, 1996). In that case, persuasive information that confronts them with possible negative outcomes is in line with their priorities in life. Research has shown that a self-defining goal results in a strong commitment that forces people to attain this desired identity (Brunstein & Gollwitzer, 1996), and does not lead to defensive or biased responses. People may experience a self-threat, but instead of reacting defensively they take the opportunity to form intentions in the advocated direction. Because no defenses are raised, self-affirmation will not make a difference.

In sum, especially in people who value health but not so much that they are willing do anything and take every opportunity to protect or increase their health, defensive reactions might be expected. However, defensive reactions may not always occur for this group. The occurrence of a defensive reaction is expected to depend on the difficulty of changing the health behavior: health behaviors that are less easy to engage in will activate stronger defensive reactions. Difficult behaviors provide a self-threat that is less easy to escape from. In this case changing habits is not an easy solution, thus people are almost forced to handle the self-threat by reacting defensively.

Fruits Versus Vegetables

In the current study we focused on two health behaviors that are expected to differ in level of difficulty of changing, namely, fruit versus vegetable consumption (Trudeau, Kristal, Li, & Patterson, 1998). Fruit is seen as easier to consume (it is sweet and needs almost no preparation), while vegetables are more difficult to consume (they are mostly bitter and require more preparation). Research has shown that only confrontation with difficult behaviors results in defensive information processing (Fry and Prentice-Dunn, 2005; Prentice-Dunn, Floyd, & Flournoy, 2001; Rippetoe & Rogers, 1987). This suggests that the ease of fruit intake prevents information defensiveness from

occurring; for vegetable intake these defensive responses are expected to be present. In the present research, we expect that a self-affirmation procedure has no effects on people's fruit intake, because defensive information processing does not need to be diminished. Self-affirmation is expected to influence vegetable consumption.

We did not include separate measurements of people's intention to eat fruits versus vegetables. Instead, we included a general measurement of people's intention to eat fruits and vegetables. This was done to make our findings comparable with the results of previous research on fruit and vegetable intake, in which a combined measure of people's intention to eat these healthy foods was used (e.g., Chatzisarantis, Hagger, Smith, & Phoenix, 2004; Gratton, Povey, & Clark-Carter, 2007; Kellar & Abraham, 2005; Lien, Lytle, & Komro, 2002; Povey, Conner, Sparks, James, & Shepherd, 1999). By combining a general measurement of intention with separate measurements of people's actual fruit versus vegetable intake, we are also able to determine whether this commonly used measurement is sensitive enough to predict behavior at all, and whether it is predictive of only fruit or only vegetable consumption.

What to Expect?

In sum, we propose that self-affirmation will only have an effect when participants can be expected to react in a defensive manner; that is, when participants perceive the behavior as difficult (when they have to increase vegetable consumption) and when health is not a top priority in their lives (when they are moderately involved). Although it remains unclear whether intentions predict participants' actual behavior, in the present study we expect to find an interaction between self-affirmation and involvement with respect to vegetable consumption. As argued above, in people who do value health, but for whom it is not a top priority, the relative difficulty of vegetable consumption will induce defensive reactions. Moreover, self-affirmation forces people to be open-minded, eliminating defensive information-processing reactions (Steele, 1988). Consequently, the self-threat becomes more salient as the information on the self-inflicted negative outcomes (the persuasive

health message) is processed unfiltered. This is expected to lead to an increase in vegetable consumption. For participants for whom health is a top priority we expect no effect of self-affirmation on vegetable consumption, because they will not react defensively to the persuasive health message. Instead, they are expected to take the opportunity to improve their health behavior, and report an increase in vegetable consumption. Concerning fruit consumption, we expect no defensive reactions. Thus, we do not expect to find an effect of self-affirmation. We do expect a general main effect of value-involvement (just as for vegetable consumption) – participants with a strong value-involvement are expected to have a more active commitment to attaining the desired goal, resulting in more fruit consumption.

Method

Recruitment, Procedure, and Design

The participants in this experimental study were students at the University of Groningen. The first administration of the questionnaire was completed during a mass paper-and-pencil testing session scheduled in the first week of the academic year. All first-year psychology students had to participate in this testing session in exchange for course credits. In total, 537 students (364 women, 109 men, 64 did not indicate gender) completed the pretest and immediate posttest. Participants were randomly assigned to one of two conditions (no self-affirmation vs. self-affirmation) of a between-subjects design. Following the self-affirmation manipulation, all participants were asked to read about the consequences of insufficient fruit and vegetable intake.

We aimed to assess the effects of both manipulations on multiple occasions. Therefore, participants were asked to complete two follow-up Internet questionnaires. In exchange for their participation they were offered the chance of winning one of 10 gift coupons, each worth 20 euros. The participants who were willing to complete the follow-up study received an email with a link to an Internet questionnaire exactly one week later. In total, 293 students (272 women, 54 men, 21 did not indicate gender) participated in the first follow-up questionnaire (one-

week posttest). Of these participants, a total of 261 students (197 women, 49 men, 15 did not indicate gender) completed the second follow-up (four-week posttest).

Paper-And-Pencil Testing Session

Pretest measurements. Participants answered a question aimed at assessing their value-involvement: "How important is health to you?" (endpoints 1 [*totally not important*] and 7 [*very important*]). Next, participants answered a detailed questionnaire about their fruit and vegetable consumption during the previous month (Bogers, Van Assema, Kester, Westerterp, & Dagnelie, 2004). The main vegetable categories were "cooked vegetables", and "raw vegetables/salad". The main fruit categories were "tangerines", "oranges/grapefruits/lemons", "apples/pears", "bananas", and "other fruits". Participants were also asked about their "fruit and vegetable juice" intake. For each of the eight categories, participants were asked how often they ate or drank it during the previous month. The answer options ranged from "*never or less than 1 day a month*" (0), "*1-3 days a month"* (1), and "*1 day a week"* (2) to "*7 days a week"* (8).[8] Six items were used as an indicator of average fruit and vegetable intake. We excluded tangerine consumption because this is a seasonal food which is not very easily accessible in the month this research was executed. We also excluded the category "fruit and vegetable juice" because this category did not enable us to distinguish between fruits and vegetables.

Self-affirmation manipulation. All participants were asked to perform a short writing exercise. They were presented with six values: theory, economics, aesthetics, social aspects of life, politics, and

[8] For each of the fruit and vegetable categories, participants were also asked to indicate how much of a product they took on average on a day when they ate or drank it. Portion sizes could be indicated in pieces (fruit), serving spoons (cooked vegetables), or glasses (fruit and vegetable juice). Or they could indicate that they consumed the product "never or less than 1 day a month". However, we did not analyze the portion size, because the participants reported amounts that were too extreme, leading to many answers that were more than 3 standard deviations above the average. In addition, there were many missing values. Consequently, portion size as a dependent variable is too fluctuating and unpredictable (see also Spiegel, Grant-Pillow, & Higgens, 2004).

religion. Participants in the self-affirmation condition were asked to select one domain which they valued most and to write about that domain (maximum of 200 words). They were asked to consider the question, "Why is this domain important to you and how do you apply it in your daily life?" Participants were also asked, "Please indicate how this domain has influenced your behavior in specific circumstances." Participants in the no self-affirmation condition were asked to choose the domain which was least valued by them. They were asked to answer the question, "Why would other students value this domain?"

Threat manipulation.[9] Participants were presented with a text about the consequences of eating less than the daily-recommended amount of fruits and vegetables. The article was supposedly published in a scientific journal. The participants were told that the aim of the study was to determine their opinions on the article. The article comprised of two pages (total of 620 words). First, the relationship between fruits and vegetables, free radicals, and the immune system were addressed. Second, it was said that students who had unhealthy eating habits ran a higher risk of acquiring a variety of diseases. In addition, the participants were shown pictures of four diseases: fever, type 2 diabetes, skin cancer, and a tumor. The text made no distinction concerning the consequences of fruit versus vegetable intake.

Dependent measurements. Two questions were aimed at assessing participants' intention to increase their daily fruit and vegetable intake: "Within the next six months I am planning to start a nutritious diet in which I will eat the daily-recommended amount of fruits and vegetables" (endpoints 1 [*certainly not planning this*] and 7 [*certainly planning this*]) and "It is likely that within the next six months I will start a nutritious diet in which I will eat the daily-recommended

[9] Previous research findings showed that the exact same message resulted in a significant self-threat. In this research we compared the threatening text about fruit and vegetable consumption to a neutral text about mustard. The results showed that participants who read the text about fruit and vegetable intake perceived the consequences of eating insufficient amounts of fruit and vegetables as being more severe than did the participants in the control condition. They also anticipated more negative consequences for insufficient fruit and vegetable intake than did the participants in the control condition.

amount of fruits and vegetables" (endpoints 1 [*certainly not likely*] and 7 [*certainly likely*]). A composite measurement was created (r = .73, M = 5.16, SD = 1.35).

Manipulation check measurements. Two items were included to assess the effectiveness of the self-affirmation manipulation. Directly after the self-affirmation manipulation, participants were asked "What kinds of images about yourself popped into your mind while performing the writing assignment?" (endpoints 1 [*negative images*] and 7 [*positive images*]). The second question was posed after the intention questions. Participants were asked whether the writing assignment gave them a good feeling about themselves (endpoints 1 [*absolutely no positive feeling*] to 7 [*very positive feeling*]).

One-Week Posttest and Four-Week Posttest

Participants who indicated that they were willing to participate in a follow-up questionnaire received an email with a link to an Internet questionnaire. The first follow-up email was sent after 1 week (one-week posttest) and the second email after 4 weeks (four-week posttest). The average time between immediate and one-week posttest was 9.11 days (SD = 2.97), and the average time between immediate posttest and four-week posttest was 32.43 days (SD = 4.22). In both follow-ups, participants answered the same fruit and vegetable questionnaire as in the pretest.[10]

Results

Attrition Analyses

Of the total of 537 participants who completed the pretest and the immediate posttest, 45.4% did not participate in the one-week posttest. The participants who did and those who did not participate in the one-week posttest differed only in reported frequency of apple/pear consumption measured at pretest (M = 3.48, SD = 2.39 and M = 3.92,

[10] When we included day (the time between immediate posttest and one-week posttest; the time between one-week posttest and four-week posttest) as a covariate, all ANOVA's remained unchanged. In addition, we did not find a main effect of day on any of the fruit and vegetable categories measured at the one-week posttest or at the four-week posttest.

SD = 2.33, respectively): F(1, 531) = 4.71, $p < .05$, $\eta_p^2 = .009$. No differences were found for the other fruit and vegetable categories (F < 1, *n.s*). Participants also did not differ in value-involvement (F < 1, *n.s*). At the immediate posttest, the analyses showed that participants who did not complete the one-week posttest reported a significantly lower intention to eat more vegetables and fruits (*M* = 5.02, *SD* = 1.38) compared to participants who did complete the one-week posttest (*M* = 5.27, *SD* = 1.31), F(1, 535) = 4.36, $p < .05$, $\eta_p^2 = .008$. Thus, participants differed in only one out of the six fruit and vegetable categories that we measured.

Inclusion of Participants

In the following analyses we included only the participants who completed the questionnaire at both the immediate posttest and the one-week posttest (N = 293).[11] The analyses of health behavior measured in the four-week posttest were based on participants who completed the immediate posttest, the one-week posttest, and the four-week posttest (N = 261).

Randomization Check

Before analyzing the results of the 293 participants who participated in both the immediate posttest and the one-week follow-up, we checked whether they were randomly assigned to one of the two conditions. A one-way ANOVA with condition (no self-affirmation vs. self-affirmation) showed no differences in the amount of fruit and vegetable consumption at pretest (F < 1.2, *n.s*). Thus, randomization to condition appears to have been successful in respect to history of fruit and vegetable consumption.

[11] The pretest and the immediate posttest measurements consisted of a paper-and-pencil questionnaire. Some participants did not answer all the questions. Therefore, the exact number of participants may fluctuate slightly when analyzing the data.

Manipulation Check of Self-Affirmation

A one-way ANOVA was conducted to test whether the self-affirmation manipulation was effective. As predicted, we found that self-affirmed participants had more positive self-images during the writing task (M = 5.67, SD = 1.19) than the non-affirmed participants (M = 4.67, SD = 1.40), $F(1, 288) = 42.73$, $p < .01$, $\eta_p^2 = .13$. Self-affirmation also gave participants a better feeling about themselves (M = 4.99, SD = 1.08) compared to the no-affirmation condition (M = 4.26, SD = 1.12), $F(1, 286) = 30.84$, $p < .01$, $\eta_p^2 = .10$.

Value-Involvement

The participants in our study valued health to a great extent. On a scale from 1 [*totally unimportant*] to 7 [*very important*] participants scored on average a 6.16 (SD = 0.87). Thus, the involvement data were negatively skewed (i.e., long tail to the left). Violations of normality lead to a degradation of findings. In this case, the chances of finding real differences are reduced, but the violation of normality does not lead to artifacts (Tabachnick & Fidell, 1996). However, data transformations to create a normal distribution hinder the interpretation of the data. We chose, therefore, to present the analyses based on the original data, and it is only mentioned when the transformed data resulted in different outcomes. The data transformation we used was lg10(8 – value-involvement), which is the recommended data transformation for data with a substantial negative skewness (Tabachnick & Fidell, 1996).

Involvement was tested as a moderator. In the case of significant moderation, a high and a low involvement group were formed. A low group was modeled by subtracting one standard deviation (1 SD below the mean) from the standardized scores of involvement in the complete set of data. A high group was modeled by adding one standard deviation (1 SD above the mean) to the standardized scores of involvement in the complete set of data (Cohen, Cohen, West, & Aiken, 2003). However, given the high raw mean scores, the low group was actually a group with a moderate health value and the high group was the group with the highest health value.

The moderate group was conceptualized as valuing health, but not seeing health as a top priority. The highest group was conceptualized as valuing health as a top priority. We did not include a group of low-involved participants, because this level of involvement seemed almost absent in our sample (see the average level of involvement).

Involvement as a Moderator of the Effect of Self-Affirmation

The moderating role of involvement on the effects of self-affirmation was tested. Two-way analyses of variance were performed (ANOVA), with condition (no self-affirmation vs. self-affirmation) and involvement level as independent variables.

Intention (immediate posttest). We found a main effect of involvement on intention to eat fruit and vegetables, $F(1, 289) = 12.47$, $p < .01$, $\eta_p^2 = .04$. Moderately involved participants indicated a lower intention ($M = 4.99$) than did strongly involved participants ($M = 5.55$). In addition, we found an interaction between self-affirmation and involvement, $F(1, 289) = 4.83$, $p < .05$, $\eta_p^2 = .02$. To interpret this interaction, we computed simple slopes for the dependent variable at two different levels of the moderator. For moderately involved participants (-1 SD), we found that self-affirmation led to more persuasion ($M = 5.20$) than no affirmation ($M = 4.77$), $F(1, 289) = 3.70$, $p < .05$, $\eta_p^2 = .01$.[12] As expected, there was no effect of self-affirmation for the strongly involved participants (+1 SD); $F(1, 289) = 1.59$, $p = .11$, $\eta_p^2 = .006$. The means were as follows: self-affirmation ($M = 5.41$) and no self-affirmation ($M = 5.69$).

As predicted, the results show that self-affirmation only influenced participants' intention formation when they were moderately involved. For these participants, a self-affirmation procedure led to a stronger intention to change. When participants viewed health as a top priority they did not react in a defensive manner, and thus self-affirmation had no effect. In addition, we found a main effect of involvement; seeing health as a top priority resulted in a stronger

[12] The results of the simple slope analyses are based on one-tailed tests, because of strong directional expectations.

intention to change. Next, we analyzed the effects of involvement and self-affirmation on actual behavior change.

Vegetable consumption (one-week posttest). We found a significant main effect of involvement on cooked vegetable consumption, $F(1, 289) = 5.03$, $p < .05$, $\eta_p^2 = .02$. Participants who were strongly involved indicated that they ate more cooked vegetables ($M = 5.83$) than did moderately involved participants ($M = 5.33$). We also found a significant interaction, $F(1, 289) = 5.38$, $p < .05$, $\eta_p^2 = .02$. For moderately involved participants we found, as predicted, that self-affirmation led to more cooked vegetable consumption ($M = 5.77$) than no self-affirmation ($M = 4.89$), $F(1, 289) = 8.30$, $p < .01$, $\eta_p^2 = .03$. Again, in accordance with our expectations, we found that a self-affirmation procedure did not influence the consumption of cooked vegetable for strongly involved participants, $F(1, 289) = 0.23$, $p = .32$, $\eta_p^2 = .001$. The means were as follows: self-affirmation ($M = 5.75$) and no self-affirmation ($M = 5.90$). Concerning raw vegetables/salad consumption we found no significant effects ($F < 1$, *n.s*). Thus, the results show that self-affirmation also influences real behavior. Again, self-affirmation has an impact only when defensive processes can be expected that need to be eliminated; thus, when participants are moderately involved. But, does this effect remain after four weeks?

Vegetable consumption (four-week posttest). We found again a significant main effect of involvement on cooked vegetable consumption, $F(1, 257) = 7.18$, $p < .01$, $\eta_p^2 = .03$. Strongly involved participants consumed more cooked vegetables compared to moderately involved participants. We did not find a significant interaction, $F(1, 257) = 1.56$, $p = .21$, $\eta_p^2 = .006$. However, the contrasts were similar to those found for cooked vegetables measured at the one-week posttest; for moderately involved participants self-affirmation led to more vegetable intake compared to no-affirmation, $F(1, 257) = 3.24$, $p < .05$, $\eta_p^2 = .01$. No difference was found for highly involved participants, $F(1, 257) = 0.01$, $p = .99$, $\eta_p^2 < .001$. See Table 3.1 for the means.

Table 3.1 The effects of self-affirmation for different levels of value-involvement on fruit and vegetable consumption (four-week posttest).

	moderate involvement		**strong involvement**	
	no SA	**SA**	**no SA**	**SA**
cooked vegetables	*M* = 5.07	*M* = 5.61	*M* = 5.91	*M* = 5.92
orange/grapefruit/ lemon	*M* = 1.09		*M* = 1.68	
apple/pear	*M* = 3.92		*M* = 4.59	
other fruits	*M* = 1.79		*M* = 2.59	

Fruit consumption (one-week posttest). Concerning fruit consumption, we expected to find a main effect of involvement only, and no interaction effect. For oranges/grapefruits/lemons we found this predicted main effect of involvement, $F(1, 289) = 5.28$, $p < .05$, $\eta_p^2 = .02$. Strongly involved participants consumed more citrus fruits (*M* = 1.53) than moderately involved participants (*M* = 1.05). For apples/pears we also found a significant main effect of involvement, $F(1, 289) = 6.60$, $p < .05$, $\eta_p^2 = .02$. Strongly involved participants indicated that they ate more apples and pears (*M* = 4.50) compared to moderately involved participants (*M* = 3.75). For bananas we found only a marginally significant main effect of involvement, $F(1, 289) = 2.91$, $p = .09$, $\eta_p^2 = .01$.[13] Strongly involved participants ate more bananas (*M* = 2.51) than did moderately involved participants (*M* = 2.08). We did not find a significant interaction between value-involvement and self-affirmation for any fruit category ($F < 2$, *n.s.*). Moreover, we found no significant effects at all for "other fruits" ($F < 2.5$, *n.s*). Next, we looked at the effects of involvement and self-affirmation on all these fruit categories after four weeks.

[13] When the transformed involvement measurement was used, the marginally significant main effect on banana consumption (one-week posttest) became somewhat less convincing, $F(1, 289) = 2.12$, $p = .15$, $\eta_p^2 = .01$.

Fruit consumption (four-week posttest). Again, we found a main effect of involvement on orange/grapefruit/lemon consumption ($F(1, 257) = 6.08$, $p < .05$, $\eta_p^2 = .02$), and apple/pear consumption ($F(1, 257) = 4.45$, $p < .05$, $\eta_p^2 = .02$). For bananas we found no significant effects ($F < 2$, *n.s*). We did find a significant main effect of involvement for "other fruits", $F(1, 257) = 8.40$, $p < .01$, $\eta_p^2 = .03$. See Table 3.1 for the means. Again, we did not find a significant interaction between value-involvement and self-affirmation for all fruit categories ($F < 1$, *n.s.*).

Mediated Moderation: Predicting Cooked Vegetable Consumption (One-Week Posttest)

The aim of the current study was to test whether intentions predicted actual behavior, and thus could be regarded as real intentions. To determine whether intention to eat fruit and vegetables predicted cooked vegetable consumption, we tested whether the interaction between self-affirmation and involvement was mediated by immediate intention. We conclude that there is mediated moderation if the effect of the interaction on the dependent variable diminishes when we include the mediator in the model, while the mediator has a significant effect on the dependent variable (Baron & Kenny, 1986). As predicted, a linear regression showed a significant effect of the interaction between self-affirmation and involvement on intention, $\beta = -.20$, $t(289) = -2.20$, $p < .05$. When we included both the interaction and intention in the model, the effect of the interaction on cooked vegetable consumption went from significant ($\beta = -.21$, $t(289) = -2.32$, $p < .05$) to non-significant ($\beta = -.12$, $t(286) = -1.38$, $p = .17$). In this complete model the unique effect of intention on cooked vegetable consumption was present, $\beta = .41$, $t(286) = 4.79$, $p < .01$. The Sobel test showed that the effect of the interaction between self-affirmation and involvement on cooked vegetable consumption after one week was mediated by intention to eat healthy immediately after reading the threatening message, Sobel $z = -2.00$, $p < .05$. These results indicate that intentions formed after a self-affirmation procedure predict actual cooked vegetable intake. We

conclude that the intentions are real. Does this effect remain present after four weeks?

Mediated Moderation: Predicting Cooked Vegetable Consumption (Four-Week Posttest)

For cooked vegetable consumption measured at the four-week posttest no significant interaction was found between involvement and self-affirmation. However, we did find the same pattern of results as for cooked vegetable consumption measured at the one-week posttest. The most interesting finding was the significant difference between no self-affirmation versus self-affirmation for moderately involved participants. To see whether intention predicted this specific effect, a linear regression analysis was performed, which showed a marginally significant effect of self-affirmation on intention for moderately involved participants (-1 SD below the mean), $\beta = .15$, $t(257) = 1.83$, $p = .07$. When we included both the interaction between moderate involvement and self-affirmation, and intention into the model, the significant effect of the interaction on cooked vegetable consumption went from significant ($\beta = .16$, $t(257) = 1.80$, $p = .07$) to non-significant ($\beta = .10$, $t(254) = 1.15$, $p = .25$). In this complete model the unique effect of intention on cooked vegetable consumption was present, $\beta = .41$, $t(254) = 4.09$, $p < .01$. The Sobel test showed, however, that the moderated mediation was not that convincing, Sobel $z = 1.65$, $p = .10$.

Although we did not find a convincing relationship between intentions measured at the immediate posttest and vegetable consumption measured at the four-week posttest, we did find a link between cooked vegetable consumption measured at the one-week posttest and the four-week posttest. The results showed that the effect of self-affirmation on cooked vegetables (four-week posttest) was mediated by cooked vegetable consumption measured at the one-week posttest (Sobel $z = 2.66$, $p < .01$).

Mediation: Predicting Citrus Fruit Consumption (One-Week and Four-Week Posttests)

For vegetable consumption we looked at moderated mediation effects. For fruit consumption we tested whether intention mediated the main effect of involvement on fruit consumption; this is, not a moderated mediation but simply a mediation effect. We conclude that there is mediation if the effect of the independent variable on the dependent variable diminishes when we include the mediator in the model, while the mediator has a significant effect on the dependent variable (Baron & Kenny, 1986). To see whether there was a mediation effect for orange/grapefruit/lemon consumption, a linear regression analysis was performed, which showed a significant effect of involvement on intention, $\beta = .18$, $t(291) = 3.19$, $p < .01$. When we included both involvement and intention in the model, the effect of involvement on citrus fruit consumption (one-week posttest) went from significant ($\beta = .12$, $t(291) = 2.11$, $p < .05$) to not significant ($\beta = .07$, $t(290) = 1.18$, $p = .24$). In this complete model the unique effect of intention on citrus fruit consumption was present, $\beta = .30$, $t(290) = 5.38$, $p < .01$. The findings of the Sobel test showed that the effect of involvement on citrus fruit consumption was mediated by intention to eat healthy, Sobel $z = 2.74$, $p < .01$. The mediation remained present for citrus consumption at the four-week posttest (Sobel $z = 2.26$, $p < .05$).

Mediation: Predicting Apple/Pear Consumption (One-Week and Four-Week Posttests)

To determine whether intention also mediated the effect on apple/pear consumption, a linear regression analysis was performed, which showed the significant effect of involvement on intention. When we included both involvement and intention in the model, the effect of involvement on apple/pear consumption (one-week posttest) went from significant ($\beta = .14$, $t(291) = 2.32$, $p < .05$) to not significant ($\beta = .06$, $t(290) = 1.17$, $p = .24$). In this complete model the unique effect of intention on apple/pear consumption was present, $\beta = .38$, $t(290) = 7.02$, $p < .01$. The Sobel test confirmed the mediation (Sobel $z = 2.90$, $p < .01$), and

the mediation remained present at the four-week posttest (Sobel z = 3.00, $p < .01$).[14]

Mediation: Predicting Other Fruit Consumption (Four-Week Posttest)

We also tested whether intention mediated the effect on other fruit consumption. A linear regression showed a significant effect of involvement on intention, β = .21, $t(259) = 3.43$, $p < .01$. When we included both involvement and intention in the model, the effect of involvement on other fruit consumption went from significant (β = .17, $t(259) = 2.80$, $p < .01$) to less strongly significant (β = .13, $t(258)$ = 2.05, $p < .05$). In this complete model the unique effect of intention on other fruit consumption was present, β = .22, $t(258) = 3.64$, $p < .01$. The Sobel test confirmed the mediation, Sobel $z = 2.49$, $p < .05$.

Discussion

Self-Affirmation and Actual Health Behavior

The aim of the current study was to show whether or not a self-affirmation procedure can lead to intentions which are predictive of actual behavior. First, this is one of the few studies (for an overview, see Epton & Harris, 2008) in which it is found that self-affirmation has an effect on actual behavior. As predicted, self-affirmed participants who were moderately involved reported that they consumed significantly more portions of cooked vegetables than non-affirmed participants. This effect remained present after four weeks. For fruit consumption we found no effect of self-affirmation, but only the predicted effect of value-involvement. The more strongly participants felt about the importance of health, the more citrus fruits, apples, pears and other fruits they consumed. These outcomes were also present up to four weeks after the manipulations. Thus, the results show that self-affirmation can lead to actual behavior up to weeks after reading the

[14] The effect of involvement on orange/grapefruit/lemon consumption and on apple/pear consumption measured at the four-week posttest was also mediated by, respectively, citrus consumption and apple/pear consumption measured at the one-week posttest (citrus fruit: Sobel $z = 2.37$, $p < .05$; apple/pear: Sobel $z = 2.52$, $p < .05$).

persuasive health message. But the effect is qualified by level of value-involvement and type of behavior.

In addition, we found that people's intention to increase fruit and vegetable intake was clearly predictive of both fruit and vegetable intake. People's intention predicted citrus fruit and apple/pear consumption after one week, and also after four weeks. For cooked vegetables the mediation effect was mainly present when vegetable consumption was measured after one week. However, for self-affirmed participants who were moderately involved, the increase in vegetable consumption after four weeks was predicted very well by behavior measured after one week. These results indicate that people's intentions measured directly after receiving a health message are predictive of actual behavior and that they are not false intentions aimed at short-term relief from the self-threat (Kok et al., 2007). The results also show that people can cognitively combine their intentions for fruit and vegetable intake in a general intention that is predictive of both types of behavior.

Sorts of Fruits Versus Sorts of Vegetables

There is a consensus among nutrition scientists that a high consumption of fruit and vegetables is related to health benefits (cf. Bogers et al., 2004). It reduces risks of cardiovascular diseases and many types of cancer. As a consequence, an important goal of health messages is to promote, with a single message, both fruit and vegetable consumption. However, the findings of the current study show that different processes determine fruit versus vegetable intake, and that different persuasive communications might be needed for both categories. This is in line with study findings that show that different psychosocial factors predict fruit and vegetable consumption (e.g., Brug, Lechner, & Vries, 1995; Trudeau et al., 1998). Trudeau et al. (1998) advised designing interventions that reach each category separately, and with most emphasis on vegetable intake. This recommendation closely matches our results, which show that especially vegetable intake is difficult to change owing to the defensive reactions people experience when confronted with a health threat.

Our research findings also show that different processes play a role for the different sorts of fruits and vegetables. We found no effect of the manipulations or of value-involvement on raw vegetable/salad consumption, or on banana consumption. It is possible that different kinds of barriers are essential in determining these behaviors. As Epton and Harris (2008) stated, each health behavior is possibly determined by different kinds of necessary adjustments. An explanation for the absence of an effect on raw vegetable/salad consumption may, for example, be found in the Dutch culture. The traditional Dutch meal is one with meat, boiled potatoes, and cooked vegetables. It is possible, therefore, that participants associate the intake of vegetables with *cooked* vegetables. Concerning bananas, there are some consistent myths – that they make you fat (Oakes, 2005), that they cause bowel obstructions, and that they do not contain many vitamins. This could cause participants not to consider bananas an effective way of averting the health risks mentioned in the threatening text. In sum, our research shows that to make health communications as effective as possible, we need information not only about the possible determinants of fruit versus vegetable consumption, but also about the different sorts of fruits and vegetables.

Defensiveness and Self-Affirmation

Self-affirmation Theory states that "[…] self-affirming thoughts should make it easier to be objective about other self-threatening information […]" (Steele, 1988, p. 290). In other words, self-affirmation procedures lead to open-mindedness by eliminating defensiveness (e.g., Harris & Napper, 2005; Reed & Aspinwall, 1998; Sherman et al., 2000). In this theory, a rather black and white picture is presented: people are either closed-minded or open-minded towards a threatening message. The findings of the current study show that it might be somewhat more complicated. All participants read a text about the negative consequences of both insufficient fruit and insufficient vegetable intake. Both types of information are supposed to induce a self-threat. Our results suggest that participants only displayed defensive responses towards the part of the message about increasing vegetable intake (i.e.,

moderately involved participants consumed fewer vegetables when not affirmed). Concerning the part about fruit intake, no defensive responses were present (i.e., no effect of self-affirmation). These results indicate that people can be selectively defensive towards parts of a threatening text. Further research is needed to create a stable view on the exact processes underlying this.

Involvement Concept

The current findings also shed some light on the importance of value-involvement in persuasive health communications. Almost all previous research was concentrated on the detrimental effects of a strong level of involvement on persuasion (e.g., Ditto & Lopez, 1992; Harris & Napper, 2005; Kunda, 1987; Liberman & Chaicken, 1992). The current research findings provide a slightly more optimistic view on the way people process threatening information. If participants see health as a self-defining aspect, they are not inclined to react defensively – we found a general main effect of value-involvement for fruit and vegetable intake. These highly involved participants reported strong intentions to consume fruit and vegetables and, as our results at the four-week/one-week posttest show, correspondingly reported eating more fruit and vegetables. It seems that a more diverse view on values and the resulting self-threat is worthwhile. Self-affirmation Theory (Steele, 1988) discusses the presence or the absence of a self-threat. However, it is possible that it is essential to include levels of self-threats or possibly types of self-threats.

Limitations

Some limitations of the present study should be taken into account when interpreting the findings. We used self-reports to measure fruit and vegetable intake. It is possible that people overestimate their own fruit and vegetable intake. However, we did use a validated scale (Bogers et al., 2004), and we included two follow-up measurements instead of using just one measurement. The follow-up measurements show a consistent pattern, making the results more reliable. However, only a replication using objective fruit and vegetable intake

measurements can eliminate all concerns about potential biases. Future research should also focus on the effects of self-affirmation on a range of other health behaviors, including health-promoting and health-compromising behaviors.

Summary and Conclusion

To our knowledge, the current study provides evidence for the first time that self-affirmation can engender true intentions; intentions that are predictive of actual health behavior. We found that this effect remained present not only after a week (like Epton & Harris, 2008), but also after a whole month. By including variations in value-involvement and by including different health-related behaviors, we provided a more differentiated picture of the way people handle self-threats. Not all involved people have to process health information in a defensive way, and people can be defensive towards only parts of a message. The current findings suggest that future research on persuasion might profit from specification of the conditions and the underlying cognitions that lead to defensive information processing and impair actual behavior change.

Chapter 4. Cognitive Self-Affirmation Inclination: An Individual Difference in Dealing With Self-Threats[15]

[15] This chapter is based on Pietersma, S., & Dijkstra, A. (accepted pending revision). Cognitive self-affirmation inclination: An individual difference in dealing with self-threats. *British Journal of Social Psychology.*

People have a fundamental need to maintain a positive global self-image (e.g., Baumeister, 1982; Steele, 1988; Tesser, 1988). According to Steele (1988) people want to feel competent, good, coherent and stable. When the self is threatened, people experience psychological discomfort that they are motivated to reduce. There is a great variety of means that people can use to maintain their self-image (for an overview, see Tesser, Crepaz, Collins, Cornell, & Bach, 2000). One very important theory about the possible means available is the Self-esteem Maintenance Model of Tesser (1988). This model emphasizes the social means that people can use to maintain self-integrity (i.e., social comparison). The current research will concentrate on a theory that explicitly focuses on the use of personal values or self-restoring images, namely Self-affirmation Theory. Self-affirmation Theory (Steele, 1988) specifically focuses on self-restoring methods that affirm some important aspect of the self that is unrelated to the threatened domain. By doing something else "good" or "adequate," people provide themselves with a positive self-image. Several studies have applied a self-affirmation procedure that mimics people's spontaneous self-affirmative actions by providing them with positive and robust self-restoring images (Sherman & Cohen, 2006). Besides these externally provided self-restoring images, people may also have more continuous access to self-generated positive self-images that they can use whenever they experience a self-threat. In the present research the focus is on existence, meaning, stability and the effects of people's natural inclination to use self-generated affirming self-images when the self is threatened. The aim is to construct a scale to measure that natural self-affirmation inclination and to take the first steps in validating this scale.

Self-Affirmation Activity

The basic tenet of Self-affirmation Theory is that people are motivated to maintain the integrity of the self (Steele, 1988). Threats to self-integrity always revolve around real or perceived failures to meet social or cultural standards. For example, the self may typically be threatened when reading information relevant to one's own unhealthy behavior

(e.g., Reed & Aspinwall, 1998), after receiving negative feedback on an IQ test (Koole, Smeets, Van Knippenberg, & Dijksterhuis, 1999) or when reading a report attacking one's political worldview (e.g., Cohen, Aronson, & Steele, 2000). How do people handle these threats and maintain their self-integrity?

Research suggests that people have a pervasive inclination to display defensive adaptations such as denying, dismissing or avoiding the self-integrity threat in some way (e.g., Liberman & Chaiken, 1992; Sherman & Cohen, 2002). Although a defensive bias can restore self-integrity, rejection of the threatening information can lessen the probability that the person will learn from the threatening information. Self-affirmation Theory (Steele, 1988) proposes a self-restoring activity that actually reduces or eliminates the need for these defensive reactions, namely self-affirmation. For example, by reminding themselves about the "good" things they value or the "good" things they have done, defensive reactions are no longer needed. Such "self-affirmations" make people realize that their self-worth does not hinge on the evaluative implications of the immediate situation. Thus, the motivation to protect self-worth is satisfied via self-affirmation, resulting in an open-minded approach to threatening messages (e.g., Sherman & Cohen, 2006).

Operationalizations of this self-restoring activity can be behavioral or cognitive, although all affirmations are aimed at underscoring "the overall worth and integrity of the self" (Sherman & Cohen, 2006, p. 188). This proposition is supported by results from studies that apply self-affirmation procedures. Several different self-affirmation procedures are used to externally provide people with self-restoring images (e.g., McQueen & Klein, 2006). The most common operationalization is one in which people first report an important value or life domain and are then given the opportunity to write an essay about it or complete a scale or exercise that allows them to assert its importance (e.g., Sherman, Nelson, & Steele, 2000). Another possible self-affirmation manipulation based on Steele's (1988) Self-affirmation Theory is providing participants with positive feedback on an important skill (Correll, Spencer, & Zanna, 2004). These self-affirmation

procedures have been shown to induce open-mindedness towards threatening information. For example, Harris and Napper (2005) showed that self-affirmation procedures resulted in increased risk perceptions for the mentioned health risk (i.e., the negative consequences of excessive alcohol consumption). In addition, Sherman et al. (2000) showed that self-affirmation manipulations resulted in a stronger intention to change unhealthy behavior according to the recommendation made in the threatening message. Thus, making alternative sources of self-integrity available by means of a self-affirmation manipulation lowers the need to protect one's self-worth and makes people more open, realistic and willing to engage in the advocated adaptive behavior change. In other words, self-affirmation leads to threat acceptance and not to threat reduction or trivialization of the threat (see also Correll et al., 2004).

Internally Available Self-Restoring Self-Images

Besides these induced ways of instigating cognitions that maintain self-integrity, there are indications that people can affirm themselves cognitively by retrieving positive self-images from memory. For example, in the absence of an explicit self-affirmation manipulation, those participants who retrieved and reported more self-affirming cognitions coped best with breast cancer, irrespective of the given intervention (Creswell, Lam, Stanton, Taylor, Bower, & Sherman, 2007). The self-affirmational resources view (Spencer, Josephs, & Steele, 1993; Steele, Spencer, & Lynch, 1993) proposes that people possess self-image resources. This view reasons that people with high self-esteem have more self-image resources available to apply in the face of threat. However, the most recent systematic review concerning self-affirmation (McQueen & Klein, 2006) emphasizes the inconsistent and fluctuating relationship between self-affirmation and self-esteem. Although Study 2 by Steele et al. (1993) does suggest that self-esteem might be a resource that people can use in the face of a threat to their self-integrity. The results of the study show that people with high self-esteem have less need to resolve cognitive dissonance as compared to people with low self-esteem. Thus, self-esteem is at least related to a

source of positive self-restoring images that people can use to deal effectively with a potential self-threat.

What does this source of positive self-restoring images look like? How are self-esteem and people's natural self-inclination related? The aim of the present research is to explicitly define and directly measure people's natural inclination to generate and access internally self-restoring self-images in the face of a self-threat. In addition, we will contrast this self-affirmation inclination with the role of self-esteem.

Natural Self-Affirmation Inclination

We conceptualize the active retrieving, considering, and weighing of important self-image resources as being that self-affirmation tendency that people have naturally. Due to the non-behavioral character of this tendency, we will define it as people's *cognitive self-affirmation inclination* (CSAI). Self-esteem may be an important variable in the context of self-affirmation. Self-esteem is a more general self-evaluation, based on a reservoir of standing resources that people can use in the face of a threat to their self-integrity (Steele et al., 1993). It is, however, the actual and active use of one's possible resources that is essential. This leads to our fundamental idea that people have a self-memory (Rogers, Kuiper, & Kirker, 1999) on which they can base their self-esteem, for example. However, people can also make active use of positive self-images available in that memory. We assume that people differ in the extent to which they use positive self-images when their self is threatened and that this difference is stable enough to be conceptualized as an individual inclination. The essence of this tendency is that people actively and strategically use positive self-images when needed, that is, when their self-integrity is threatened. We define cognitive self-affirmation as the inclination to react with "pop-ups" of positive self-images in the face of self-threats.

By introducing the concept of self-memory, the relationship between CSAI and self-esteem becomes clearer. We can state that both CSAI and self-esteem originate from the same source (i.e., from the self-memory) and, therefore, show some overlap. However, both concepts have unique aspects that work separately and have separate

effects. CSAI is an activity aimed at maintaining self-integrity merely by using available self-images. Thus, people with a high CSAI do not add or strengthen positive images in self-memory; they just use existing memories. This is in line with the research findings that report no effect of self-affirmation procedures on self-esteem measurements (for an overview, see McQueen & Klein, 2006).

In order to measure people's CSAI, we developed a new scale. The scale items ask people for the perceived frequency with which they normally use or think of positive self-images. The items capture the active maintenance of one's self-integrity (Tesser & Cornell, 1991) by asking for responses to statements such as, "I realize that besides all the 'stupid' things I do, I also do some things very well." There are also statements that refer more generally to the inclination to think of positive self-images such as, "I notice that I did some things very well." These statements refer to the active cognitive remembrance and summary of actions that underscore one's self-worth.

Overview of Studies

In four different studies, one cross-sectional, one longitudinal and two experimental, the focus is on the uniqueness, the meaning, the stability and the effects of the CSAI of people. These studies try to uncover the natural self-affirmation tendency of people in the context of persuasive health communication, because threats in these domains cover self-threats to the essence of one's being, in other words, the very physical conditions that determine the length and quality of one's life. Health communications emphasize the enhanced risk for self-inflicted negative outcomes (for an overview, see Harris & Napper, 2005).

Study 4.1

To develop a measurement for CSAI and to increase our understanding of this concept, a survey was conducted among smokers. Because self-esteem is the most commonly used concept to explain the effects of self-affirmation procedures (e.g., McQueen & Klein, 2006), we contrasted CSAI with self-esteem. Research concerning self-esteem indicates that this positive self-conception enables one to uphold an

unrealistically positive outlook when confronted with self-threatening material. For example, Gerrard, Gibbons, Reis-Bergan, and Russell (2000) showed that people who have high self-esteem do not fully acknowledge their vulnerability to the negative consequences of their own behavior. In addition, Steele et al. (1993) have shown that for people with high self-esteem, an inconsistency between their cognitions and actions (i.e., a self-threat) does not result in the commonly found strongly negative feeling one needs to resolve. In explaining these effects of self-esteem, Steele et al. (1993) refer to the use of available self-related resources to restore global self-worth. We claim, however, that this active use of one's self-image resources is a unique concept, which is related to a realistic outlook instead of a generally positive outlook. In other words, we state that self-esteem and CSAI (i.e., the active use of positive self-images) are distinct concepts. Consequently, we should have different expectations concerning the roles played by CSAI and self-esteem.

Sherman and Cohen (2006) showed that self-affirmation manipulations resulted in open-mindedness due to active use of positive images. Consequently, it should be expected that smokers who have a strong CSAI will become more realistic, leading to the experience of a significant self-threat when presented with a persuasive health message. Using negative self-evaluative emotions as an indicator of self-threat (Dijkstra & Buunk, 2008), we expected that the stronger one's CSAI, the more negative self-evaluative emotions smokers should experience due to their smoking. In addition, because they are more open-minded, they may also experience a higher personal risk (e.g., Harris & Napper, 2005). In contrast, for self-esteem we expected that, because of the generally positive outlook self-esteem causes, it should be related to experiencing weaker negative self-evaluative emotions and a lower risk.

Method

Recruitment and Procedure

Smokers were recruited using advertisements in local newspapers throughout the Netherlands. They could then choose to receive a paper-

and-pencil questionnaire, which they could return by envelope, or to receive an email with a link to an Internet questionnaire. Participants who completed the entire questionnaire were offered the chance to win one of 20 gift coupons, each worth 20 euros. We received 250 completed questionnaires. Eleven participants who only smoked cigars or pipes were not included in the analyses, because such smokers generally do not inhale the smoke, thus resulting in a different health risk. We were left with 239 questionnaires (160 women, 78 men, 1 did not indicate gender).

Questionnaire

The questionnaire began with some general questions concerning the smoking behavior of the participants. Next, participants completed the 10-item Rosenberg self-esteem scale (1965) (e.g., "I am in general very satisfied with myself," with endpoint labels of 1 [*totally not agree*] to 5 [*totally agree*]). The answers to some questions were reversed, so that a high score corresponded to high self-esteem (α = .85, M = 3.90, SD = 0.77).

Subsequently, participants answered questions concerning their risk perception (Dijkstra, De Vries, & Bakker, 1996). The items assessed the anticipated negative physical and social outcomes of smoking, and could be scored from *"not sure"* or *"not expecting a certain outcome"* (0) to *"strong expectation of the outcome"* (3). Concerning the long-term physical disadvantages, participants were presented with three statements: "Smoking increases my risk of…lung cancer/cardiovascular diseases/chronic lung conditions." In addition, participants responded to statements concerning the short-term physical consequences of smoking: "Smoking deteriorates my…health/condition/my appearance." The social outcomes consisted of the following three items: "Smoking…is bad for the health of people around me/is an annoyance for people around me/makes me a bad example for people around me." Principal component analysis with varimax rotation revealed two clearly interpretable factors. One component referring to the physical consequences (6 items; α = .88, M

= 1.63, *SD* = 0.77). The other component referred to the social consequences (3 items; *α* = .80, *M* = 1.40, *SD* = 0.87).

Following this, participants' emotions related to their smoking behavior were mapped. First, participants were asked to indicate how frequently in the past thirty days they felt a particular emotion due to their smoking behavior. For example, participants were asked, "How often do you feel angry at yourself because you smoke," with endpoint labels of *never* (1) to *very often* (5). Participants indicated the frequency of the following emotions: angry, guilty, being fed up, infuriated, regretful, disappointed, feeling ill at ease, humiliated by others, ashamed, embarrassed by others, feeling inferior, looking silly and being less worthy. The 13 items were averaged to create a composite measurement (*α* = .94, *M* = 1.83, *SD* = 0.80). Second, participants were asked to imagine that they wanted to quit smoking and the resulting emotions they would feel when they no longer smoked cigarettes. The same 13 emotional outcomes were mentioned, but participants were asked whether they thought that quitting smoking would lower these negative emotions, for example, "If I quit smoking, I will be less angry with myself," with endpoint labels of *totally not agree* (1) to *totally agree* (5). The 13 items were averaged to create a composite measurement (*α* = .95, *M* = 2.17, *SD* = 1.07). Finally, participants were asked to indicate whether quitting smoking would result in more positive emotions. Three different statements were presented: "If I quit smoking… I will think more positively about myself, I will have more self-respect, and I will be prouder of myself." A composite measurement was created (*α* = .89, *M* = 3.26, *SD* = 1.34).

We measured participants' tendency to affirm themselves cognitively by presenting statements. Participants had to answer whether or not they had specific thoughts (endpoints 1 [*never*] and 5 [*very often*]). Ten items were presented; however, six items were retained to create a CSAI scale (see the results section concerning the scale development). The following six statements were part of the final CSAI scale: "I notice that I did some things very well," "When I feel bad about myself, I think about all the things that I can be proud of," "I think about the past and all the things that I did well," "I think about all

the things that I have successfully completed," "When I have done something wrong that made me feel dissatisfied with myself, I say to myself that I do not do everything wrong," and "I realize that besides all the 'stupid' things I do, I also do some things very well." The questions were averaged to create a composite measurement (α = .83, M = 2.62, SD = 0.74).

Results and Discussion

Scale Development and Reliability

To create a CSAI scale, we generated a list of items that reflected the active use of positive self-images. This initial effort resulted in ten items. Exploratory principal component analysis was conducted on these items. One factor was extracted from this analysis (eigenvalue of 5.73), which explained 57% of the variance. All of the items correlated strongly with each other (correlations between .29 and .71; $p < .001$). In addition, the conceptualization of CSAI as "the active use of one's self-esteem resources" determined that there should be some mild to moderate overlap between CSAI and self-esteem (i.e., both originate from the same source, which is the self-memory, and therefore both concepts should display some overlap). This coincides with the findings of Steele et al. (1993) that the Rosenberg self-esteem scale (1965) at pretest determines the effectiveness of self-affirmation. As a result, four items were eliminated because they were not significantly related to self-esteem (correlations between .08 and .12; $p > .05$). The remaining six items did correlate with self-esteem (correlations between .15 and .42, $p < .05$), leaving a 6-item scale with a good internal consistency (α = .83).

CSAI Versus Self-Esteem

CSAI and self-esteem correlated significantly (r = .31, $p < .01$). In order to illuminate the predicted exclusive content of cognitive affirmation, we controlled for the relationship with self-esteem in all of the following analyses of Study 4.1. To further increase our understanding of CSAI and how it differs from self-esteem, identical

analyses were conducted for CSAI and self-esteem. All the analyses concerning self-esteem were controlled for the effect of CSAI.

Physical and Social Consequences of Smoking and/or Quitting

CSAI and the perceived social disadvantages of smoking were significantly related (partial $r = .16$, $p < .05$). This indicates that people who display a high level of cognitive self-affirmation tend to judge the negative social consequences of smoking as more strongly present. However, CSAI did not correlate significantly with the perceived physical consequences of smoking (partial $r = .07$, $p = .31$). The relationship between self-esteem and both outcome measurements proved to be exactly the opposite (concerning social outcomes: partial $r = -.21$, $p < .01$; concerning physical outcomes: partial $r = -.28$, $p < .01$). Thus, the relationship between CSAI and social outcomes is in line with the reasoning that the inclination should be related to increased open-mindedness towards threatening information. And the relationship between self-esteem and social and physical outcomes is in line with the reasoning that high self-esteem should be related to a general positive perception.

Emotional Outcomes

Reported negative self-evaluative emotions due to smoking behavior (partial $r = .21$, $p < .01$) and expectations about relieving these negative emotions in the case of quitting (partial $r = .13$, $p < .05$) were significantly and positively related to CSAI. CSAI was also marginally related to an increase in expected positive self-evaluative emotions in the case of quitting (partial $r = .12$, $p = .08$).

In contrast, self-esteem was negatively related to the reported negative self-evaluative emotions due to smoking (partial $r = -.35$, $p < .01$) and the expected lowering of negative emotions in the case of quitting (partial $r = -.34$, $p < .01$). Furthermore, self-esteem was negatively related to expected positive self-evaluative emotions in the case of quitting (partial $r = -.20$, $p < .01$). Thus, the positive relationship between CSAI and negative self-evaluative emotions is in line with the idea that people are more open-minded, less defensive

and ready to accept the self-threat. In contrast, the negative relationship between self-esteem and negative self-evaluative emotions is in line with the idea that people give reality a more positive bias. This notion is further supported by the participants' expectation of less positive self-evaluative emotions in the case of quitting.

In sum, these findings are in line with the idea that CSAI can be described as a psychological process that results in an accepting, realistic and open mindset. In contrast, self-esteem corresponds to an unrealistically positive outlook.

Study 4.2

Study 4.1 indicated that a strong CSAI coincided with an accepting and realistic mindset. The aim of the second study was to determine the reproducibility (i.e., stability, reliability) of this new individual difference variable. Thus, with repeated administrations of the CSAI scale, how similar are the answers people provide to the questions posed (i.e., test-retest effects)? To answer this question, participants were asked to complete the CSAI scale at two different moments in time. The average time period between both administrations was 1.5 weeks. In addition, we aimed to provide some data on the construct validity of the CSAI scale. The hypothesis is that the stronger participants' CSAI the more positive thoughts they report in the face of a health threat.

Method

Recruitment and Procedure

The participants in this longitudinal study were students at the University of Groningen. The first administration of the questionnaire was completed during a mass testing session scheduled in the first week of the academic year. All first-year psychology students had to participate in this testing session in exchange for course credits. During this testing session participants answered multiple paper-and-pencil questionnaires. In total 562 students (377 women, 119 men, 66 did not indicate gender) completed the first measurement of the CSAI and the question aimed at determining the construct validity of the CSAI scale. All participants were asked whether they would be willing to answer a

short follow-up Internet questionnaire. In exchange for completing the follow up they were offered the chance to win one of 10 gift coupons, each worth 20 euros.

The participants who were willing to participate in the follow-up study received an email with a link towards an Internet questionnaire exactly a week later. In total 310 students (226 women, 60 men, 22 did not indicate gender) completed the CSAI scale for the second time. In the test-retest analyses we have included only those participants who completed the CSAI questionnaire at both moments in time.

Measurements

CSAI. Cognitive self-affirmation was measured at both times by the six questions presented in Study 4.1. The CSAI scale proved to have a good internal consistency at both the first measurement (α = .74, *M* = 2.69, *SD* = 0.60) and also at the second measurement (α = .84, *M* = 2.87, *SD* = 0.73).

Positive images. Participants were asked about their positive thoughts to determine the construct validity of the CSAI scale.[16] More specifically, after the first measurement of CSAI all participants read a threatening text about the negative health consequences of insufficient fruit and vegetable intake. Afterwards we asked them "How many positive thoughts did you have when you read the text?" (endpoints 1 [*no positive thoughts*] and 7 [*many positive thoughts*]).

Results and Discussion

Dropouts

Of the total 562 participants who completed the first measurement, 44.8% of these participants did not complete the second measurement of the CSAI scale. Fortunately, the participants who did not complete the second measurement of CSAI (*M* = 2.71, *SD* = 0.61) did not differ

[16] Before participants read the threatening text, half of the participants wrote about important values in their life, while the other half wrote about their least important values. This manipulation was part of another study present in the mass testing session. To unconfoundedly measure the link between CSAI and positive thoughts we only included participants who were not first forced to generate positive thoughts – that is, think about positive values (N = 269).

from those participants who did complete the second questionnaire in terms of their answers to the six items measuring CSAI (M = 2.66, SD = 0.59), $F(1, 560) = 0.95$, $p = .33$, $\eta_p^2 = .002$.

Reliability of the CSAI Scale

The test-retest analysis showed a strong correlation between the first measurement and the second measurement of the CSAI ($r = .72$, $p < .01$). In addition, an Intra Correlation Coefficient ($ICC_{agreement}$ or ICC [A,1], see McGraw & Wong, 1996) was computed to confirm the stable and reliable character of the scale. The results showed a satisfactory reliability (ICC = .69, $p < .01$). In conclusion, at the two testing times, separated by about 1.5 weeks, scores on the scales were highly associated. This suggests that the CSAI scale is a stable and reliable measurement over time. The level of stability of this new individual difference measurement resembles personality measurements such as agreeableness and friendliness (e.g., Caprara, Barbaranelli, Borgogni, & Perugini, 1993; Tsaonnis & Kerpelis, 2004).

Construct Validity of the CSAI Scale

We found a significant correlation between CSAI and the amount of positive thoughts ($r = .20$, $p < .01$). Thus, participants with a strong CSAI reported more positive images when confronted with a self-threat than participants with a low CSAI. These outcomes support the construct validity of the CSAI scale.

Study 4.3

Study 4.1 indicated that a strong CSAI coincided with an open and rational approach toward threatening information. However, do people with a strong CSAI react in the same rational and open way to induced levels of threat? Also, how effective do these self-affirmational processes remain in the face of very strong self-threats? Previous research showed that self-affirmation manipulations increase open-mindedness towards many different threatening experiences. Some threats entail, for example, writing an essay that contradicts long-held beliefs about capital punishment (e.g., Cohen et al., 2000). Threats can

also consist of a self-inflicted physical threat such as the consequences of unsafe sex (Sherman et al., 2000) or real-life threats such as facing loss or trauma (Bonanno, Field, Kovacevic, & Kaltman, 2002). These findings coincide with the statement by Sherman and Cohen (2006) that "self-affirmation *inoculates* people against threat, and thus making them open to ideas that would otherwise be too painful to accept" (p. 205). Thus, the activation of positive self-images is characterized in the literature as a very powerful and robust tool in dealing with or defending oneself against all kinds and levels of self-threats. Accordingly, Study 4.3 aimed to show an equalizing effect of self-affirmation: self-restoring images enable one to restore one's self-integrity and be open-mindedly independent of the level of threat. Therefore, in Study 4.3, participants were confronted with both a moderately threatening and a highly threatening health message about the negative consequences of having too much stress.

Besides an equalizing effect from the mobilization of self-affirmational resources, what exactly can be expected in both the moderately and the highly threatening condition? Previous research shows a consistent pattern of findings concerning the handling of moderate self-threats (e.g., Sherman & Cohen, 2006; Spencer, Fein, & Lomore, 2001). When participants undergo a moderate self-threat without being provided with a self-affirmation manipulation they react in a defensive manner, for example, by rejecting the content of the message (e.g., Sherman et al., 2000). However, when participants undergo a self-affirmation manipulation, they react with increased acceptance and processing of the self-threatening information. From the perspective that CSAI leads the individual to apply a self-affirmation procedure internally in the face of a self-threat, the same pattern could be expected. Individuals with a weak CSAI will react defensively towards moderately threatening information, while those with a strong inclination will be more accepting of the self-threatening information.

Where a high threat is entailed, the same is to be expected for participants with a strong CSAI. They will be able to accept the message because their readily available positive self-image will prevent the defensive reflex in information processing. Thus, for these

participants, the moderately and the highly threatening information will lead to similar levels of acceptance and persuasion. The reactions to highly self-threatening information by participants with a weak CSAI, however, are less easy to predict. It is possible that a strong self-threat is so confronting that defensive reactions are no longer effective in warding off the threat and people are "forced" to accept the threat. For example, when people experience an extreme fear (e.g., arachnophobia), this results in an adaptive response such as an increased need to adopt the recommendations present in the message (e.g., analogous to the extensive focus on the spider instead of avoidance; Pflugshaupt, Mosimann, Von Wartburg, Schmitt, Nyffeler, & Müri, 2005). One can also reason, as is commonly done in the fear-appeal literature, that a strong self-threat further intensifies the defensive reactions present (Witte & Allen, 2001). In that case, the acceptance might even be lower as compared to a moderate level of threat.

CSAI was determined at pretest by the measurement presented in Study 4.1. The effects of the threatening health messages were assessed using a commonly used outcome measurement in persuasion research: the intention to act in accordance with the recommendations.

Method

Participants and Design

Ninety students (72 women, 18 men) at the University of Groningen and the Hanze University Groningen participated in exchange for partial course credit or 5 euros. Participants were randomly assigned to one of two conditions. In the first condition, participants read a highly threatening text, and in the second condition, participants read a moderately threatening text.

Procedure

The students were invited to the laboratory to participate in a series of studies related to stress. Study sessions were completed in separate cubicles, and all measurements were presented via computers. First, some pretest measurements were taken. Next, participants read a

health message about stress. Then they were asked to complete the questions comprising the dependent measurements, which were said to be questions necessary for collecting important information about students and stress. Finally, the experimenter debriefed the participants carefully.

Materials and Measurements

Pretest measurements. Before measuring CSAI, participants were first asked to answer two questions concerning how they intended to cope with stress: "When you experience stress, will you be planning to actively try to lower the level of stress?" (endpoints 1 [*certainly not planning this*] and 9 [*certainly planning this*]) and "When you experience stress, how likely is it that you will actively try to lower the level of stress?" (endpoints 1 [*certainly not likely*] and 9 [*certainly likely*]). The questions were averaged to create a composite measurement (r = .74, M = 6.79, SD = 1.64). We also measured the level of self-esteem of the participants by means of the Rosenberg (1965) self-esteem scale (α = .82, M = 3.99, SD = 0.59). Finally, as in Studies 4.1 and 4.2, we measured participants' individual tendency to affirm themselves cognitively. The six items were then averaged (α = .80, M = 2.89, SD = 0.62).[17]

Threat manipulation. To induce a self-threat, participants were presented with a text about the negative consequences of experiencing stress. The text was ostensibly from a brochure designed by the University of Amsterdam. This university was said to be specialized in research concerning stress and that they had only recently started doing research on the stress experienced by students. It was said that the findings collected so far were combined, resulting in an information brochure about "students and stress." The participants were told that the aim of the study was to evaluate the brochure. Participants were presented with a text of two pages, each on a different screen through which they could scroll (total of 375 words). First, the definition of

[17] In Studies 4.3 and 4.4, the second item of the CSAI scale was slightly different ("When I feel bad about myself, I think about all the good things that I'm able to do").

stress was addressed: "Stress is a physical reaction to a stimulus." It was said that even temporary and low levels of stress increase the production of stress hormones. Second, the causes of stress were described (e.g., "stress is dependent on the assessment of whether or not you can handle a certain situation"). Third, three consequences of stress were described in both conditions: cardiovascular diseases, infectious diseases and burnout. In the highly threatening condition, it was said that these diseases were very severe and resulted in awful outcomes (e.g., "numerous deaths in the Netherlands each year"). In the moderately threatening condition, it was noted that the diseases were not that severe and resulted in milder outcomes (e.g., "antibiotics can stop the infections, but the symptoms may persist for up to three weeks").

Dependent measurements. Responses to three statements, measured in terms of 7-point scales, assessed the participants' intention to lower their stress level. "When I experience stress in the next six months, I will be planning to try to lower the stress (in every possible way)" (endpoints 1 [*certainly not planning this*] and 7 [*certainly planning this*]). "When I experience stress in the next six months, it is likely that I will try to lower the stress (in every possible way)" (endpoints 1 [*certainly not likely*] and 7 [*certainly likely*]). And, lastly, "When I experience stress in the next six months, I will be willing to try to lower the stress (in every possible way)" (endpoints 1 [*certainly not willing*] and 7 [*very willing*]). A composite measurement was created for intention (α = .92, M = 5.51, SD = 1.20).

We only included indirect-manipulation check questions in order to check the effectiveness of the threat manipulation. Participants were presented with three statements concerning self-evaluative emotions, for example, "When I experience stress in the next three months and don't make sure that the stress level decreases, I will feel dissatisfied about myself" (endpoints 1 [*totally not agree*] and 5 [*totally agree*]). Participants were also asked how ashamed and dumb they would feel if they did not decrease their stress level. A composite measurement was created for self-evaluative emotions (α = .75, M = 2.04, SD = 0.80).

Results and Discussion

Manipulation Check

We expected that the highly threatening text would induce a more negative image of the expected consequences of stress, resulting in more negative emotions. To test this prediction, we conducted a one-way analysis of variance (ANOVA). As predicted, we found that participants who read the highly threatening text expected to experience marginally significantly more negative emotions when experiencing stress in the near future (M = 2.17, SE = 0.15) than participants who read the moderately threatening text (M = 1.86, SE = 0.15), $F(1, 83) = 3.27$, $p = .07$, $\eta_p^2 = .04$.

Inclusion of a Covariate

Before testing the moderating role of CSAI, the relationship between intention and the pretest measurements of intention was examined. A strong correlation between both measurements would influence the analysis with which we were testing the moderating role of CSAI (Yzerbyt, Muller, & Judd, 2004). Correlation analysis showed a strong relationship between both measurements, $r = .75$, $p < .01$. Consequently, the pretest measurement of intention was included as a covariate in the analyses.

Moderating Role of CSAI on Intention

A two-way analysis of covariance (ANCOVA) was conducted to test whether the effect that the threatening message had on intention depended on CSAI. Level of threat was included as a factor and CSAI as a continuous variable. As predicted, a significant interaction was found, $F(1, 80) = 5.06$, $p < .05$, $\eta_p^2 = .06$. We computed simple slopes for the dependent variable at two different levels of the moderator. The complete data set was used to model participants scoring low or high on CSAI by respectively subtracting one standard deviation (1 *SD* below the mean) from the standardized scores and adding one standard deviation to the standardized scores (1 *SD* above the mean) (Cohen, Cohen, West, & Aiken, 2003). For the participants who displayed low levels of cognitive affirmation, we found that the level of threat

determined the amount of persuasion. The simple slopes analysis showed that the participants in the highly threatened group reported a stronger intention (M = 5.58) than the moderately threatened group (M = 5.08), $F(1, 80) = 4.29$, $p < .05$, $\eta_p^2 = .05$ (see Figure 4.1).

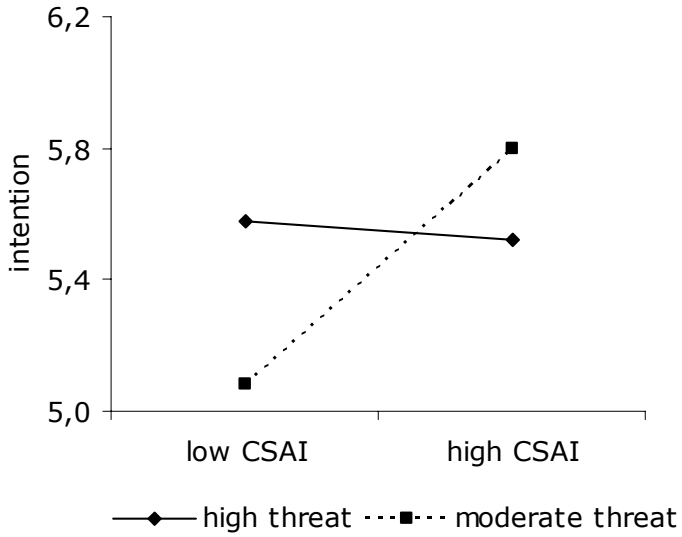

Figure 4.1 Intention as a function of cognitive self-affirmation inclination and threat, Study 4.3.

For the participants who displayed high levels of cognitive affirmation we expected an equalizing effect; no difference between either of the threatening conditions in terms of intention. The simple slopes analysis illustrated the non-significant difference, $F(1, 80) = 1.35$, $p = .25$, $\eta_p^2 = .02$. The means were as follows: highly threatening condition (M = 5.52) and moderately threatening condition (M = 5.80).

These findings also supported the expectation that for those participants who were confronted with a moderately threatening text, a high level of cognitive self-affirmation should result in a significantly higher intention than a low level of cognitive affirmation ($r = .36$, $p < .05$). For highly threatened participants, it was found that the presence of self-affirmational processes did not lead to significantly lower levels of persuasion ($r = -.03$, $p = .85$).

Controlling for Self-Esteem

Does the two-way ANCOVA remain significant when we control for the influence of self-esteem? To answer this question we included the main effect of self-esteem, but also the interaction between condition (high threat vs. moderate threat) and self-esteem. This was done because self-esteem and CSAI correlated significantly (r = .52, p < .01). The inclusion of this interaction enables one to further correct the affirmation measurement (Yzerbyt et al., 2004). The results showed that the inclusion of self-esteem did not alter the moderating role that CSAI has on intention; the interaction between CSAI and threatening conditions remained significant, $F(1, 78) = 4.40$, $p < .05$, $\eta_p^2 = .05$.

Study 4.4

Study 4.3 showed the equalizing effects of CSAI. Study 4.4 aimed at replicating this effect and taking it one step further by including an external self-affirmation procedure. We formulated two expectations. First, for participants with a weak CSAI, it was expected that the external self-affirmation procedure would result in the exact same pattern of persuasion as was found in Study 4.3. Second, for participants who displayed high levels of cognitive self-affirmation, we expected to find no effects from the self-affirmation manipulation because their high level of spontaneous use of self-affirmation would have already evened out all the effects (just as in Study 4.3). The external self-affirmation procedure consisted of a standard self-affirmation manipulation. Participants received positive bogus feedback on a test that was said to predict future success in work and social relationships (Schwinghammer, Stapel, & Blanton, 2005; Steele et al., 1993).

Method

Participants and Design

One hundred and ninety-five students (123 women, 72 men) at the University of Groningen and at the Hanze University Groningen participated in exchange for partial course credit or 5 euros. Participants were randomly assigned to one of four conditions of a 2 (no self-

affirmation vs. self-affirmation) x 2 (high threat vs. moderate threat) between-subjects design.

Procedure

After being welcomed to the laboratory (individual cubicles), participants were told that they would participate in a series of studies that involved, among other things, stress and a test. All measurements were conducted by computer. Before the participants were exposed to any manipulation, some pretest measurements were taken. Subsequently, half of the participants underwent a self-affirmation procedure. The other half of the participants performed a puzzle task. Next, the participants read a text about stress (same threat manipulation as in Study 4.3). Again the aim of the study was said to be the evaluation of the folder concerning "students and stress." Next, the participants were asked to complete the questions comprising the dependent measurements. Finally, the experimenter debriefed the participants carefully.

Materials and Measurements

Pretest measurements. Similar pretest measurements were taken as described in Study 4.3. Both items measuring intention were averaged to create a composite measurement (r = .79, M = 6.57, SD = 1.92). We also created a composite measurement for the Rosenberg (1965) self-esteem scale (α = .83, M = 4.02, SD = 0.64). The six items measuring CSAI were also averaged (α = .76, M = 2.99, SD = 0.65).

Self-affirmation manipulation. The participants were asked to complete the SFAI-test (i.e., Social Functioning and Ambition Inventory Test), which was said to predict future success in work and social relationships very reliably. Participants were presented with ten statements (e.g., "I would rather not be responsible for other people") and were asked to indicate to what extent these statements applied to them (endpoints 1 [*not at all like me*] and 5 [*very much like me*]). In the self-affirmation conditions, participants were affirmed using positive bogus feedback on their test. They were then asked to write down why their score was so high. Participants who did not undergo the self-

affirmation procedure were given a puzzle task. They were asked to unscramble the names of twenty animals.

Dependent measurements. The same measurements were taken as described in Study 4.3. The intention measurements were averaged to create a composite measurement (α = .90, M = 5.67, SD = 1.13). The three questions concerning negative self-evaluative emotions were also averaged (α = .76, M = 2.17, SD = 0.93). To explicitly check the effectiveness of the threat manipulation, we included three additional questions concerning the perceived risk of contracting the diseases caused by stress. Participants were asked, "What is your risk of contracting cardiovascular disease when you experience stress?" The same was asked for infectious diseases and burnout. Participants could give an answer on an 11-point scale (endpoints 1 [*no risk*] and 11 [*100 percent risk*]). A composite measurement was created for perceived risk (α = .81, M = 4.28, SD = 2.05).

To check the effectiveness of the self-affirmation manipulation, we included one additional question. Participants reported their self-feelings as a result of the task they performed: "Did your completion of the SFAI-test/puzzle task result in a positive feeling about yourself?" (endpoints 1 [*totally no good feeling*] and 7 [*very good feeling*]).

Results and Discussion

Manipulation Check

A 2 (no self-affirmation vs. self-affirmation) x 2 (high threat vs. moderate threat) ANOVA showed the expected main effect of the threat manipulation; participants who read the highly threatening text perceived their personal risk for the diseases caused by stress as higher (M = 4.90, SD = 2.06) than did those participants who read the moderately threatening text (M = 3.64, SD = 1.83), $F(1, 191) = 19.74$, $p < .01$, $\eta_p^2 = .09$. Just as in Study 4.3, we also found an indication of the effect that the threat manipulation had on reported negative self-evaluative emotions. Participants who read the highly threatening text expected more negative emotions when experiencing stress in the near future (M = 2.28, SD = 0.96) than did participants who read the moderately threatening text (M = 2.05, SD = 0.90), $F(1, 191) = 3.39$,

p = .07, η_p^2 = .02. The self-affirmation manipulation also showed the expected effect on self-feelings. Self-affirmed participants reported significantly more positive self-feelings (M = 5.45, SD = 1.04) than did non-affirmed participants (M = 4.76, SD = 1.40), F(1, 191) = 15.02, p < .01, η_p^2 = .07.

Inclusion of a Covariate

Before testing the moderating role of CSAI, we again checked the relationship between intention and pretest measurement of intention. The correlation analysis showed a strong correlation between both measurements (r = .69, p < .01): therefore, intention measured at pretest was included as a covariate in the analyses.

Moderating Role of CSAI on Intention

It was predicted that the interaction between the self-affirmation manipulation and the threat manipulation would only be significant for participants who displayed a low level of cognitive self-affirmation. This two-way interaction was predicted to be absent for participants with high levels of cognitive affirmation. Thus, within a three-way ANCOVA we expected – only for participants with low levels of cognitive self-affirmation – that the two-way interaction between the self-affirmation manipulation and the threat manipulation would be significant. To test these hypotheses, we computed the two-way interactions separately for low (1 *SD* below the mean) and high levels of cognitive self-affirmation (1 *SD* above the mean). Just as in Study 4.3, we used the complete data set to model the participants scoring low or high on the moderator. As predicted, we found a significant 2 (no self-affirmation vs. self-affirmation) x 2 (high threat vs. moderate threat) interaction for participants who displayed low levels of cognitive self-affirmation, F(1, 186) = 9.59, p < .01, η_p^2 = .05. And, again as predicted, a two-way interaction between the threat manipulation and the self-affirmation manipulation was absent for participants who displayed high levels of cognitive self-affirmation, F(1, 186) = 0.80, p = .37, η_p^2 = .004.

Each interaction was unraveled by computing the contrasts between the four conditions for low and high CSAI separately. For the participants who displayed low levels of cognitive affirmation, we expected that when a self-affirmation manipulation was absent we would find a significant difference in reported intention for different levels of threat. The simple slopes analysis showed that the participants in the highly threatened group reported a stronger intention (M = 5.83) than did the moderately threatened group (M = 5.17), $F(1, 186) = 7.77$, $p < .01$, $\eta_p^2 = .04$. For the participants who underwent a self-affirmation procedure, we expected an equalizing effect, that is, no difference between either threatening condition for intention. The simple slopes analysis illustrated the non-significant difference, $F(1, 186) = 2.44$, $p = .12$, $\eta_p^2 = .01$. The means were as follows: highly threatening condition (M = 5.50) and moderately threatening condition (M = 5.86) (see Figure 4.2).

Concerning those participants who reported low levels of cognitive self-affirmation, the findings also supported the expectation that adding a self-affirmation manipulation would result in a higher intention when confronting participants with a moderately threatening text, $F(1, 186) = 8.65$, $p < .01$, $\eta_p^2 = .04$. For those participants who were confronted with a strong self-threat, it was found that the presence of self-affirmational processes did not change the level of persuasion, $F(1, 186) = 2.07$, $p = .15$, $\eta_p^2 = .01$.

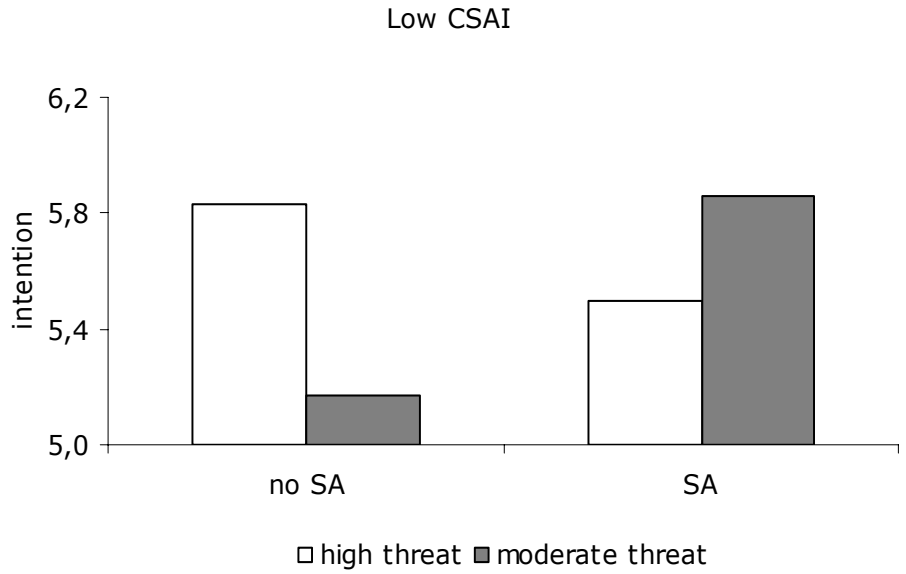

Figure 4.2 Intention as a function of *low* cognitive self-affirmation inclination, self-affirmation manipulation and threat, Study 4.4.

For those participants who displayed high levels of cognitive self-affirmation, we expected that level of threat and presence or absence of self-affirmation would have no influence on reported intention. Not one simple slope analysis showed a significant difference (see Figure 4.3). The participants in the highly threatened group (M = 6.01) and the participants in the moderately threatened group who did not undergo a self-affirmation procedure (M = 5.64) also did not differ, $F(1, 186) = 1.99$, $p = .16$, $\eta_p^2 = .01$. Participants who did undergo a self-affirmation procedure also did not differ when either moderately (M = 5.67) or highly threatened (M = 5.73), $F(1, 186) = 0.10$, $p = .75$, $\eta_p^2 = .001$. The data also confirmed the expectation that, for those participants with a high level of cognitive self-affirmation, the absence or presence of a self-affirmation manipulation would not influence reactions to a highly threatening message ($F[1, 186] = 1.24$, $p = .27$, $\eta_p^2 = .007$) or moderately threatening text ($F[1, 186] = 0.01$, $p = .91$, $\eta_p^2 < .001$).

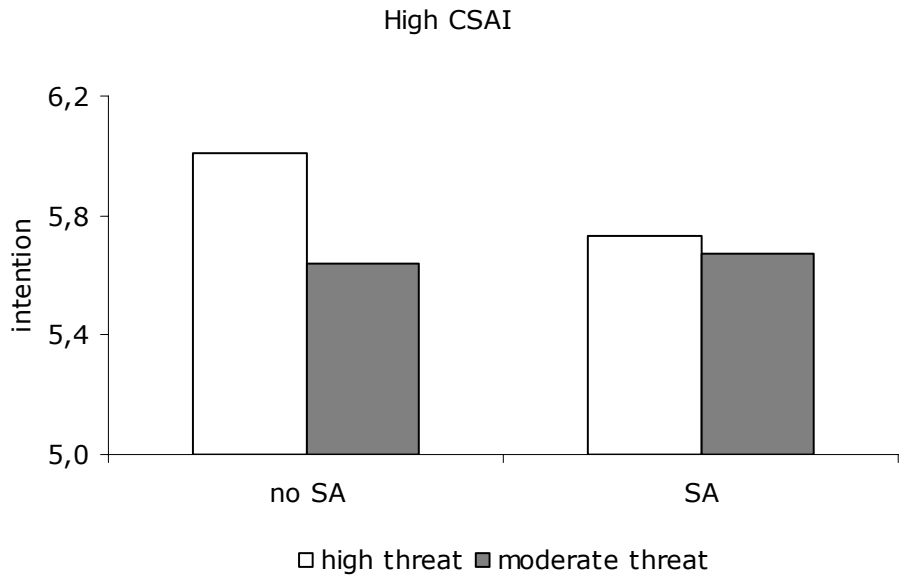

Figure 4.3 Intention as a function of *high* cognitive self-affirmation inclination, self-affirmation manipulation and threat, Study 4.4.

Controlling for Self-Esteem

Both two-way interactions between the self-affirmation manipulation and the threat manipulation could be due to the influence of self-esteem. Therefore, we controlled for the potential influence of self-esteem measured at pretest. In the analyses performed, we included both the main effect of self-esteem and the self-esteem in interaction with the manipulations (i.e., we included two-way interactions and a three-way interaction). Just as in Study 4.3, this was done because self-esteem and CSAI correlated significantly (r = .44, p < .01). Both two-way interactions did not change significantly when we controlled for self-esteem (for low CSAI: F[1, 182] = 9.50, p < .05, η_p^2 = .05; for high CSAI: F[1, 182] = 0.22, p = .64, η_p^2 = .001). The results indicate that CSAI has its own influence, which is independent of self-esteem.

General Discussion

The goal of the present studies was to show the stability, meaning and effects of a new scale that was designed to measure an individual's CSAI. This inclination is thought to be related to people's cognitive reactions towards self-threats. In people high in CSAI, positive self-images strategically enter the individual's awareness when their self is threatened, in order to restore their positive self-view. One basic expectation is that self-affirmed people will be more open-minded towards the threatening information (Sherman & Cohen, 2002). Study 4.1 showed that those high in CSAI reported more negative consequences and more negative emotions with regard to their smoking behavior, which is in line with the notion of less defensiveness and more open-mindedness. Study 4.2 showed the stable character of the CSAI scale, and provided support of the construct validity of the CSAI scale. In addition, Study 4.3 showed that higher scores on CSAI were related to more persuasion in the case of a moderate threat. This is also in line with the notion of increased open-mindedness and replicates past findings (e.g., Harris & Napper, 2005), but is also in line with the findings in Study 4.4 on the persuasive effects of the application of a self-affirmation procedure. The similarity of effects between a strong CSAI and self-affirmation procedures suggests that they refer to the same self-restoring mechanism, the availability of positive self-images (Sherman & Cohen, 2006).

Participants with a weak CSAI displayed a defensive reaction towards the moderate threat. However, in Studies 4.3 and 4.4 this defense seemed no longer effective when the threat was high (Fry & Prentice-Dunn, 2005). It may be that the defense "leaked" the threatening information and that participants tried to cope with the resulting self-threat by forming an intention to change the unhealthy behavior that was the basis of the self-threat. In contrast, in participants with a strong CSAI, the cognitive self-affirmation activities seemed equally effective under moderate and high threat. The positive self-images that came to mind when the participants were confronted with the threat seemed capable of avoiding defensive reactions (closed-mindedness), even when the threat was high. Again, the pattern of

persuasion in the case of high threat was the same as the pattern when a self-affirmation procedure was applied, thus suggesting the same self-restoring mechanism, the availability of positive self-images. This conclusion is further supported by the finding that in people with a strong CSAI, the self-affirmation procedure no longer had any effect. In other words, because these people actively used positive self-images that prevented defensive reactions, the self-affirmation procedure could no longer make a difference through lowering defenses. Thus, people with a strong CSAI were already saturated with positive self-images.

CSAI and Self-Esteem

We assume that the positive self-images that come to mind when people are confronted with a threat stem from self-memory (Rogers et al., 1999). At the same time, this self-memory may be the basis for the global self-evaluation that is referred to as a person's self-esteem. This notion that self-esteem and the positive self-images that our measurement assessed both originate from the same memory pool is supported by the moderate but significant correlation between a state of self-esteem (Rosenberg, 1965) and CSAI (r = .31). However, the present data also suggest that both psychological factors differ in essential ways. Study 4.1 showed that despite their positive correlation, the correlations with criterion variables were opposite, thus suggesting open-mindedness through cognitive self-affirmation and a generally positive outlook through self-esteem. In addition, including self-esteem as a covariate did not change the moderating effects of CSAI in Studies 4.3 and 4.4. Overall, our conclusion is that CSAI and self-esteem are related but different psychological phenomena. This might mean that in past studies in which self-esteem moderated the effects of self-threats (e.g., Stone & Cooper, 2003), the effects may have been confounded by cognitive self-affirmation and at least partly reflected the effects of cognitive self-affirmation.

Limitations

There are some limitations about the present studies that should be taken into account when interpreting the findings. Importantly, we did

not assess whether the moderating effects of CSAI were, indeed, mediated by positive self-images. In principle, it is possible that other mechanisms (e.g., social comparison) that are related to self-reports of the frequency of thinking of positive self-images are responsible for these effects. However, the similarity between the effects of self-affirmation procedures and the moderating effects of CSAI strongly suggest that the mediation is caused by positive self-images. In other words, most self-affirmation procedures are designed to provide people with positive self-images and often do not offer social comparison or other types of information that could be held responsible for these effects (e.g., McQueen & Klein, 2006). In addition, Study 4.2 showed a significant link between CSAI and positive thoughts. Nevertheless, future studies could try to track the mediation by positive self-images.

Future Research

The fact that CSAI can function as a stable individual difference has implications for other lines of research. As the present data suggest, CSAI could be relevant in research into persuasive communication. In more general terms, in all paradigms in which the self is threatened, CSAI can help explain the effects. In addition, studies of self-esteem should take into account (e.g., control for) CSAI. Furthermore, psychiatric phenomena such as depressed mood and narcissism could be related to low or excessive use, respectively, of cognitive self-affirmation. The effects of CSAI on social interaction might be of interest. For example, what are the effects of CSAI on self-presentation, the need for self-identity or for stereotyping? Lastly, what is the role of CSAI in the context of Terror Management Theory (for an overview, see Solomon, Greenberg, & Pyszczynski, 2004) in which people use self-esteem to lower their fear of death? These questions suggest that CSAI as a concept has the potential to help us further in many different areas of social psychology.

Chapter 5. Cancer and Death-Related Thoughts: The Influence of Different Perceptions of the Severity of Cancer and Self-Affirmation on Death-Thought Suppression[18]

[18] This chapter is based on Pietersma, S., Dijkstra, A., & Arndt, J. (2009). *Cancer and death-related thoughts: The influence of different perceptions of the severity of cancer and self-affirmation on death-thought suppression.* Manuscript in preparation.

Cancer is a leading cause of death worldwide (World Health Organization, 2007). It is a disease frequently mentioned in health campaigns and is portrayed as a potential lethal consequence of many unhealthy habits, from insufficient fruit and vegetable intake to smoking tobacco. On average about 40% of the people who are diagnosed with cancer do not survive the disease (Dutch Cancer Society, 2007; National Cancer Institute, 2004). Thus, there is a strong objective link between cancer and death. This is reflected in the perception of people; thinking about cancer is associated with fears of death (e.g., Ferrell, Grant, Funk, Otis-Green, & Garcia, 1998).

In examining some of the cognitive and motivational dynamics involved with the association between cancer and death-related cognition, Arndt, Cook, Goldenberg, and Cox (2007) initially found that priming the thought of cancer did not lead to an increase but to a decrease in the accessibility of death-related thoughts. Subsequent studies in this series suggested that this was due to active attempts to suppress the association with death. Such processes were suggested to occur because people are often motivated to avoid thinking about their mortality. Indeed, a number of studies derived from Terror Management Theory have indicated that reminders of one's own death lead to suppression of death-thoughts to remove them from focal awareness (e.g., Greenberg, Solomon, & Pyszczynski, 1997). However, people may differ in the extent to which they associate cancer with death. One factor that may drive such differences is the perceptions people have about the severity or preventability of cancer. Some people perceive cancer as a treatable disease or as a disease they can somehow control, while others perceive it as a death penalty (Powe, 1995). Thus, people's personal perceptions of cancer may determine the extent to which they link cancer to death, and thus the level of psychological threat that the topic of cancer presents. This suggests that, depending on the severity of perceived threat, self-regulatory processes like suppression may be differentially effective in lowering the threat of cancer and thus its capacity to trigger thoughts of death.

To find out to what extent people suppress death-related thoughts we apply self-affirmation. This involves making people think

about cherished values or attributes (Steele, 1988). Self-affirmation has been shown to result in open-mindedness towards an array of threats, including those pertaining to health and physical well-being (for overviews, see McQueen & Klein, 2006; Sherman & Cohen, 2006). By applying self-affirmation and thus encouraging an open-minded approach to a threat like cancer, we can potentially better understand the defensive dynamics by which people manage the threat of cancer and its capacity to trigger death-related cognition. In sum, the purpose of the current study is to illuminate how people's personal perceptions of cancer influence the extent to which they experience death-related thoughts. One main explanatory perspective on the underlying processes is that quantitative differences in the experience of death-related thoughts are due to differences in suppression of these thoughts.

Cancer and Terror Management Research

With regard to cancer in general, research has shown that thinking of cancer can be distressing and can arouse feelings of vulnerability (Bowen, Helmes, Powers, & Andersen, 2003). Consequently, people may cope with the threat by minimizing estimates of personal risks (e.g., Croyle, Sun, & Hart, 1997). In addition, the threatening nature of cancer seems to motivate people to suppress death-related thoughts associated with cancer (Arndt et al., 2007; Erblich, Montogomery, Valdimarsdottir, Cloitre, & Bovbjerg, 2003). The reasons why people are so motivated to suppress death-related thoughts generally, and in health contexts particularly, is described by Terror Management Theory (for an overview, see Solomon, Greenberg, & Pyszczynski, 2004) and its more recent application to health in the terror management health model (Goldenberg & Arndt, 2008). Terror Management Theory (derived from the work of Ernest Becker, 1971, 1973) is based on the premise that humans are in a precarious position due to the conflict between biological motives to survive and the cognitive capacity to realize life will ultimately end. This generally unconscious awareness that death is inevitable, coupled with the proclivity for survival, creates potential paralyzing anxiety. However, Terror Management Theory

suggests that people have defense mechanisms that prevent them from experiencing the anxiety that this awareness might be expected to engender. Different defenses have been shown to deal with both conscious and unconscious mortality awareness (for reviews, see Goldenberg & Arndt, 2008; Pyszczynksi, Greenberg, & Solomon, 1999).

Traditionally, Terror Management Theory has focused on the effects of unconscious concerns with mortality, showing that people manage this awareness by investing in a meaningful conception of the world (cultural worldview) and maintaining a sense of self-worth (for a review, see Greenberg et al., 1997). However, more recently research has also examined the ways in which people manage conscious concerns with death. Specifically, when such thoughts are in conscious awareness they trigger responses aimed at removing death from consciousness. For example, Greenberg, Pyszczynski, Solomon, Simon, and Breus (1994) found that immediately after contemplating mortality, levels of death-thought accessibility were low, but increased when a time interval was introduced (e.g., reading a short message). In sum, people respond to confrontations of explicit reminders of death with efforts to get rid of these thoughts from conscious awareness.

Recently Arndt et al. (2007) focused on the link between cancer and death. They showed that participants' reactions to reminders of cancer are not simply the same as reminders of mortality. Replicating prior research (e.g., Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997; Greenberg et al., 1994), they found that priming mortality increases death-related thoughts when a delay was introduced between the death-prime and the accessibility measures. However, the effects of a cancer prime differed from the effects of a mortality prime. The cancer prime did not produce elevated levels of death-accessibility after the delay. In additional studies Arndt et al. (2007) showed that the low levels of death-related thoughts were due to an even fiercer suppression of death-thoughts. Why would the thought of cancer instigate stronger suppression tendencies of death-related thought than the thought of death itself?

The commonly used mortality salience manipulation makes people think about their emotions when considering their own death

and what will happen to them once they physically die or are dead. As Arndt et al. (2007) speculated, this is an abstract referral to death. However, when asking people about getting or having cancer they can have many associations (e.g., Whitaker, Brewin, & Watson, 2008). Cancer could be linked to the process of saying farewell to friends and family, anxiety for a painful death, embarrassment for being the person who is dying, suffering, uncertainty of death due to different beliefs in the treatability etc. All these associations related to cancer, in turn, have their association with death. That is, activation of the concept of cancer activates broader associative memory networks that are all to a certain degree associated with death. Thus, a cancer prime may lead to a more widespread activation of the concept of death than a mortality prime.

These associations pertaining to cancer provide some insight into why cancer may arouse an especially robust suppression of death-related thoughts as it spreads to implicate strongly the network related to death. However, this may be more or less threatening to people depending on people's perceptions of cancer (i.e., the treatability of cancer and response efficacy in preventing cancer). We propose that such differences in the beliefs about the severity of cancer will influence the level of threat that is induced by the cancer prime. This level of threat will determine the amount to which people display defensive or suppressive tendencies with regard to death-related thoughts.

Personal Perceptions of Cancer

Cancer is a very prevalent disease. Many people know someone who has been diagnosed with some type of cancer. Some of these people have experienced that cancer can be treated, while others have experienced that cancer is fatal (National Cancer Institute, 2004). In addition, many health campaigns emphasize that people can influence whether or not they get cancer (e.g., eat healthy, exercise regularly), while we are also presented with messages that stress the importance of genetic aspects in cancer (Ugalde, Martin, & Rees, 2008); a breast cancer gene that influences the risk of getting cancer irrespective of health habits. All these experiences and messages may influence

people's perceptions concerning cancer. Some people may come to the conclusion that there is the possibility that cancer can be cured or that they can perform behaviors that lower their risk of getting cancer (Powe, 1995); thus that cancer is not necessarily connected to death. Others may develop beliefs that being diagnosed as having cancer is equivalent to a death penalty. Thus, although cancer is portrayed as a very serious disease with potential lethal consequences, people will differ in how strongly they cognitively link cancer and death with each other. The accessibility of the memory network of death will influence the level of threat associated with cancer. We propose that participants who perceive cancer as somehow under personal control experience the threat as less severe than people who see cancer as uncontrollable and lethal. This level of threat will determine to what extent people are motivated to suppress death-related thoughts and thus how many death-related thoughts they will experience when primed with cancer.

Self-Integrity Threat and Suppression

The self-regulatory action of suppression is central in predicting the extent to which the concept of death is activated in people with different perceptions of cancer. Research in persuasive health communication has provided a wealth of data on suppressive or defensive responses towards threatening information. On the basis of these findings we propose that at least four subsequent states of threat and suppression are possible. First, when the level of threat is low, people may not be motivated to suppress. The threat is simply too small to generate any response. Second, when the level of threat increases, people may become motivated to suppress death-related thoughts in order to down-regulate the threat. Suppression mechanisms may do their job adequately, like is found in many studies in the field of health communication. For example, Morris and Swann (1996) showed that sexually active students who saw an AIDS educational message responded by lowering their perceived risk for sexually transmitted diseases, which is a defensive response. Third, when the threat further increases, the suppression of the threat may not be completely successful and may start leaking, so to speak. Although the suppression

is still "on," the threat may be experienced; the threat is too potent to be completely suppressed and people have to tolerate the threat (see Ruiter, Abraham, & Kok, 2001; Witte, 1992). Fourth, when the threat further increases it leads to an overload and another more effective way of coping with the threat is activated. Na (1999) found this shift in regulatory strategies; when people become too involved a threshold is passed and objective processing is hindered. Thus, a threat that is too overwhelming forces a next level of defense (i.e., renewed defenses) (see also, Block & Williams, 2002). As research has shown there are many different types of defensive responses (e.g., Good & Abraham, 2007). In the current research it is not necessary to define which type of defensive response is exactly into play. So when we refer to "renewed defense" we do not refer to any defensive response in particular. In sum, we propose that there is an inverted u-shaped relation between the level of threat and the amount of death-related thoughts people experience (i.e., we formulate four states; no defenses, effective defenses, leaking defenses, and next level defenses). In all states, except the first one, people display regulatory attempts.

This sequence of reactions to a threat may be observed in many situations. Imagine an employee receiving feedback. When the feedback is not very negative, this person may be able to face it, listen open-minded to it. There is no need to get defensive because there is no pertinent negative implication for the self. When the feedback becomes more negative, the employee may start to use rational (or pseudo-rational) strategies of doubting the feedback and questioning the source of the feedback. At this point, these defenses are adequate in protecting the self. When the feedback becomes even more negative, the employee may get angry and defensive, still doubting and questioning the feedback. The defenses start leaking although they are still activated. The person experiences a more severe threat, in this case to their self-worth or self-integrity, despite active defenses. When the negative feedback further increases, the employee may no longer want to communicate, he gets mute or walks out of the room. A next level of defense is mobilized. Thus, different subsequent defensive

reactions may serve the same goal and when one defensive reaction fails, another may be activated. In the above example, the increasing negative feedback motivates a further engagement of the employee's defensive maneuvers. In this study on the confrontation with the concept of cancer, the threat and defensive maneuvers are primarily caused by the increasing association of cancer with death. In sum, we propose that the associations pertaining to cancer determine the level of threat and this dictates the regulatory attempts that people employ. To find out whether these regulatory processes are operative we apply self-affirmation. Research has shown that self-affirmation eliminates defensive or suppressive tendencies (e.g., Sherman & Cohen, 2002, 2006). By comparing the presence and absence of self-affirmation we can see whether people are somehow regulating death-related thoughts.

Self-Integrity Maintenance Options and Self-Affirmation

In seeking to understand how self-affirmation can be used to unravel the underlying processes involved when people are primed with cancer, we first discuss the theoretical basis of self-affirmation. According to Self-affirmation Theory, people have a fundamental need to maintain a positive global self-image, to maintain a sense of self-integrity (Steele, 1988). This sense of self-integrity in turn enables people to confront and withstand a variety of forms of threatening information. For example, when encountering vulnerability to illness, people may better tolerate the vulnerability by more globally affirming their self-concept; a process referred to as self-affirmation. Self-affirmation involves thinking about cherished values or attributes. In essence, self-affirmation refers to the generation of positive self-images which are unconnected with the threatening event. People can do things to affirm themselves, but in psychological research people can also be affirmed using experimental manipulations. An example of a self-affirmation manipulation is providing participants with very positive feedback on a bogus questionnaire about their social skills before having them read a threatening health message (Cohen, Aronson, & Steele, 2000). Self-affirmation should make people realize that their self-worth is not

determined by the evaluative implications of the immediate situation. The result of self-affirmation is that people become open-minded towards the threatening information and no longer react defensively to the threatening information (e.g., Sherman & Cohen, 2002, 2006). In other words, self-affirmation allows people to adopt a more open-minded approach to considering health threats.

Self-affirmation prevents people from displaying defensive information processing. This does not mean, however, that the self-threat is trivialized or that people simply become very agreeable (Correll, Spencer, & Zanna, 2004). Instead, there are strong indications that self-affirmation makes people painfully aware of the threat. For example, Harris and Napper (2005) found that self-affirmation increases the negative emotions people feel when thinking about the risks of alcohol consumption, instead of lowering these emotions. In addition, Harris, Mayle, Mabbott, and Napper (2007) showed that self-affirmation increases participants' negative thoughts and emotions about smoking. These findings indicate that self-affirmation forces people to acknowledge the threat, causing negative emotions. Thus, self-affirmation makes people increasingly aware of the threat that is present in a health message by weakening all initial attempts to process health messages in a defensive manner. As Harris and Napper (2005) state, self-affirmation leads not to threat reduction but to threat acceptance.

These effects of self-affirmation are not under personal control and when exposed to a self-affirmation, people's suppressive or defensive self-regulations are weakened. People become involuntarily confronted with the threatening information. Applying self-affirmation may therefore present a means to find out whether participants are displaying defensive tendencies; when self-affirmation has an effect it can be inferred that people, in the absence of self-affirmation, were displaying some regulatory processes that were prevented after self-affirmation. Which regulatory processes are engaged, we suggest, will depend on the level of the threat that is induced and more openly acknowledged in light of the self-affirmation. On the one hand, it may be that with self-affirmation a person is forced to open-mindedly

acknowledge the threat; the threat does not activate renewed defenses. On the other hand, the threat may be so strong that renewed defenses are mobilized. It is an empirical matter what level of threat will induce the defenses.

On the basis of earlier studies on death-related thoughts and cancer, we formulate the following expectations. People who experience a moderate threat from thinking about cancer (i.e., cancer is seen as treatable or preventable) are expected to react with effective defenses (i.e., suppression) and, therefore, experience few death-related thoughts. Adding a self-affirmation forces people to tolerate the threat (i.e., leaking defenses), which results in more death-related thoughts. People who experience a strong threat from thinking about cancer (i.e., cancer is seen as poorly treatable or preventable) are expected to attempt to unsuccessfully suppress the threat (i.e., leaking defenses). Because self-affirmation forces people to be open-mined, it will facilitate a more stark confrontation with the topic of cancer. Consequently, cancer will be seen as more threatening, (the threshold is passed) and this results in the activation of a next level of defense and, therefore, to less death-related thoughts. In sum, by including self-affirmation into the current studies we induce open-mindedness and depending on the initial level of threat, this will lead to more or to less death-related thoughts.

The Present Research

The aim of the current research is to show that individual differences in people's perceptions of cancer, and the availability or use of self-affirmational resources, influence the extent to which the concept of death is accessible when confronted with the topic of cancer. Each study was conducted to examine a different facet of these relationships. Study 5.1 was designed to asses the general effect of self-affirmation when participants are primed with cancer, and to relate our procedures and materials to earlier studies. No individual differences were included or considered in this study yet. Study 5.2 considered the influence of individual differences in the perceptions of curability of cancer. Study 5.3 aimed to replicate Study 5.2 by manipulating perceptions of

treatability. In addition, we also assessed the influence of individual differences in the perceptions of preventability of cancer. In these three studies, the cancer prime was supraliminal, allowing conscious regulatory processes to be mobilized. In contrast, Study 5.4 tested what happens when participants are subliminally primed with the topic of cancer and how the perception of treatability influences the accessibility of the concept of death.

Study 5.1

Study 5.1 was designed to asses the general effect of self-affirmation when participants were primed with cancer and to relate our procedures and materials to earlier studies. As in Arndt et al. (2007), we asked participants to think about either their own mortality, or about contracting cancer or about having dental pain. The group participants who thought about dental pain was the control group. For participants who were not affirmed we expected to replicate the effects of Arndt et al. (2007); a death prime should result in more death-related thoughts in comparison to both the cancer prime and the dental pain prime. In addition, by looking at the effects of self-affirmation in combination with a mortality prime we can see whether we can replicate the findings of Schmeichel and Martens (2005). They found that when participants are affirmed, a mortality prime leads to a low level of death-related thoughts. Schmeichel and Martens (2005) indicated that when participants are confronted with a mortality salience prime, self-affirmation of important values functions to bolster participants' faith in their worldview as a meaning system and thus better insulates people from accessible death-related cognition. Thus, according to Schmeichel and Martens, their results with regard to self-affirmation can be explained by the worldview-boost it provides and the lowering effect of this on the accessibility of the concept of death.

However, what could we expect from self-affirmation when people are primed with cancer? We do not expect that self-affirmation will facilitate this reduction in death-related cognition. From studies on persuasion it has become clear that; 1) people raise defenses when confronted with health topics such as cancer and; 2) self-affirmation

induces open-mindedness. In this light, whereas reminding people of death in the way that has been done in most terror management studies leads to more abstract associations with death, reminding people of cancer leads to broader and more affectively oriented associations with death and, consequently, more suppression of death-related cognitions. Thus, the starting point of a death prime and a cancer prime are expected to be different and, therefore, the effects of self-affirmation may also be different.

Method

Participants

One-hundred and twenty-seven students from the University of Groningen participated in exchange for partial course credit. The study was part of a number of online studies that first-year psychology students had to complete in the first months of the academic year. In an online system they could click on a link that brought them to the study. The participants were randomly distributed to one of three conditions (mortality salience prime vs. cancer salience prime vs. dental pain prime) of a between subjects design.

Procedure

The students were told that they were going to participate in several different studies. To provide the participants with a reason for completing these different studies it was said that all studies concerned topics in which the responsible researcher was somehow involved. Participants were first asked to complete the cognitive self-affirmation scale. Previous research showed that this individual tendency has the same effects as self-affirmation procedures; cognitive self-affirmation inclination induces open-mindedness when people experience a self-integrity threat (Pietersma & Dijkstra, 2007). Next, participants were instructed to think about their own mortality, about contracting cancer, or about an aversive control topic (i.e., dental pain). Dental pain was selected as control condition because it is an aversive topic that may elicit general negative affect. The inclusion of an aversive topic rather than a neutral topic allows us to control for this general negative affect.

The cognitive self-affirmation scale and the salience manipulation were presented as a study on thoughts and feelings. Participants subsequently completed some delay tasks. This delay was included, because previous research indicates that a mortality salience induction only increases death-thought accessibility after a delay. This delay makes it possible for death-thoughts to get outside focal attention (Arndt et al., 1997). Next, participants completed the measurement of death-thought accessibility, which was said to be a study to language use.

Materials and Measurements

Pretest measurements. We measured participants' self-affirmation tendency. Participants were presented with six statements and were asked to indicate whether or not they had the specific thoughts (endpoints 1 [*never*] and 5 [*very often*]). The following statements were presented: "I notice that I did some things very well," "When I feel bad about myself, I think about all the things that I can be proud of," "I think about past and all the things that I did well," "I think about all the things that I successfully completed," "When I have done something wrong that made me feel dissatisfied with myself, I say to my self that I do not do everything wrong," and "I realize that besides all the 'stupid' things I do, I also do some things very well." The questions were averaged to create a composite measurement (α = .89, M = 2.96, SD = 0.81). We also added some filler questions, which concerned health and illness.

Salience manipulation. The different primes were induced by presenting participants with two open-ended questions used in prior research (e.g., Arndt et al., 2007; Rosenblatt, Solomon, Pyszczynski, & Lyon, 1989). The open-ended instructions for the mortality salience condition were as follows: "Please briefly describe the emotions that the thoughts of your own death arouse in you," and "Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically death." Resembling questions were asked in the cancer and dental pain salience conditions: "Please briefly describe the emotions that the thoughts of cancer/dental pain

arouse in you," and "Jot down, as specifically as you can, what you think will happen to you as you physically get cancer/experience dental pain and once you are physically gotten cancer/experienced dental pain."

Delay tasks. The first delay task consisted of a self-report mood scale (PANAS; Watson, Clark, & Tellegen, 1988). Subsequently, participants were presented with a neutral text about the history of mustard. The article was supposedly published in a Dutch journal. The participants were told that the aim of the study was to determine their opinion about the article. Participants were presented a text of 620 words and the text also contained some pictures of mustard seeds and mustard plants.

Death accessibility. All the participants were presented with a word completion task that was designed to measure the accessibility of death-related thoughts, based on those developed in previous research (e.g., Greenberg et al., 1994). They were asked to rely on their first thoughts. Participants were presented with 15 word fragments, 6 could be completed as a death-related or neutral word. The completion of the word fragments could result in the following death-related words: cremation, pass away, corpse, heritage, funeral, and grave (i.e., these words are translations of Dutch words). A rater coded these 6 completed word fragments. The words which were death-related were coded as "1," while all other words were coded as "0". Next we added the scores of these six measurements (M = 0.65, SD = 0.72).[19]

[19] This measurement of death-thought accessibility is designed by Fransen, Fennis, Pruyn, and Das (2005). In this original scale they used 10 word fragments to map death-related thoughts. However, we eliminated 4 word fragments. Two word fragments were eliminated because they referred to ceremonies related to peoples dead and these words do not occur in the English measurement (Arndt et al., 2007). Two other word fragments were eliminated because the inclusion of both prevented a significant main effect of the salience manipulation. And previous research indicated that such a main effect should be present (e.g., due to the strong difference between the mortality salience condition and the control condition). Thus, by eliminating 4 word fragments we were able to create a measurement that conceptually and statistically fitted the English measurement of death-thought accessibility.

Results

A two-way analysis of variance (ANOVA) was conducted to test whether the effect of the salience manipulation on death-related thoughts depended on individual differences of cognitive self-affirmation inclination. Salience manipulation was included as a factor, and cognitive self-affirmation inclination as a continuous variable. As predicted, a significant interaction was found, $F(2, 121) = 3.70$, $p < .05$, $\eta_p^2 = .06$. The complete data set was used to model participants scoring low or high on self-affirmation inclination by, respectively, subtracting one standard deviation (1 SD below the mean) from the standardized scores and adding one standard deviation (1 SD above the mean) to the standardized scores (Cohen, Cohen, West, & Aiken, 2003).

For participants with a low self-affirmation tendency we found a significant effect of the salience manipulation, $F(2, 121) = 4.37$, $p < .01$, $\eta_p^2 = .08$. The contrast analysis showed that for people with a low self-affirmation tendency a death salience manipulation led to significantly more death-related thoughts ($M = 1.16$) compared to thinking of cancer ($M = 0.56$), $F(2, 121) = 7.96$, $p < .01$, $\eta_p^2 = .06$. Thinking of death also resulted in significantly more death-related thoughts than thinking of dental pain, ($M = 0.57$), $F(2, 121) = 8.67$, $p < .01$, $\eta_p^2 = .07$. No significant difference was found between the cancer salience condition and the control condition, $F(2, 121) = 0.02$, $p = .90$, $\eta_p^2 < .001$. These findings replicate the outcomes of Arndt et al. (2007) and indicate that thinking of cancer leads to a robust suppression of death-related thoughts.

For participants with a high self-affirmation tendency we also found a significant effect of the salience manipulation, $F(2, 121) = 3.59$, $p < .05$, $\eta_p^2 = .06$. The contrast analysis showed that the death salience condition resulted in significantly more death-related thoughts ($M = 0.68$) than the cancer condition ($M = 0.27$), but did not differ significantly from the control condition ($M = 0.83$), respectively $F(2, 121) = 4.26$, $p < .05$, $\eta_p^2 = .03$, and $F(2, 121) = 0.35$, $p = .56$, $\eta_p^2 = .003$. In addition, thinking of cancer did result in significantly less death-related thoughts than thinking of dental pain, $F(2, 121) = 6.29$, p

< .05, η_p^2 = .05. This suggests that participants with high affirmational tendencies may have approached the topic of cancer with a more open-minded orientation and been especially motivated to actively lower the accessibility of the concept of death. Thus, cancer primed participants appeared to differ from mortality primed participants in their need to suppress death-related thought (Schmeichel & Martens, 2005).

The results also showed that in the death salience condition a strong self-affirmation tendency was related to significantly less death-related thoughts (r = -.31, p < .05). This replicates the findings of Schmeichel and Martens (2005). In contrast, in the cancer prime condition and in the dental condition the relation between self-affirmation tendency and death-related thought was not significant, respectively r = -.25, p = .10, and r = .21, p = .19 (see Figure 5.1).

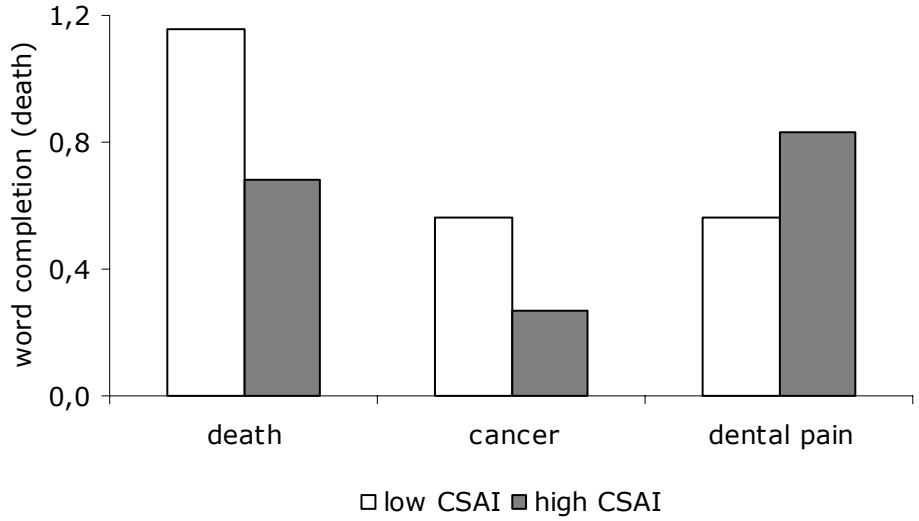

Figure 5.1 Death-thought accessibility as a function of salience manipulation and self-affirmation tendency, Study 5.1.

Besides the moderating effect of self-affirmation inclination, we also found a significant main effect of the salience manipulation, F(2, 121) = 5.88, p < .01, η_p^2 = .09. Participants who thought about death reported significantly more death-related thoughts (M = 0.92) than participants who thought about cancer (M = 0.42), F(2, 121) = 11.75, p < .01, η_p^2

= .09. We found no difference between the death salience condition and the control condition (M = 0.67), F(2, 121) = 2.69, p = .10, η_p^2 = .02. In addition, we found a marginally significant difference between thinking about cancer and thinking about dental pain, F(2, 121) = 2.93, p = .09, η_p^2 = .03. Thinking of cancer resulted is somewhat less death-related thoughts than thinking of dental pain. These results also suggest that thinking of cancer leads to stronger suppression.

Study 5.2

In Study 5.2 we looked at the influence of participants' perceptions concerning the treatability of cancer as assessed at pretest on death-related thoughts. Level of threat is thought to be related to how treatable people perceive cancer; the more treatable people think that cancer is, the less cancer should be associated with the concept of death, and thus the less threat thinking of cancer should induce. In case of high treatability, the threat is thought to be substantial, but because the link between cancer and death is not very strong, it can be averted adequately with self-regulatory suppression (i.e., effective defenses). When this suppression is prevented by self-affirmation, the resulting threat increases and the defenses are no longer effective in averting the threat (i.e., leaking defenses). Thus, for participants who believe cancer is treatable we expected that adding self-affirmation would lead to significantly more death-related thoughts when they contemplate the disease.

In the case of low treatability, however, the threat is sufficiently stronger such that people's effort to suppress its connection death-related thought may be ineffective and thus increased accessibility of death-related cognition should be observed (i.e., leaking defenses). Moreover, when suppression is weakened because of the openness produced by self-affirmation, the resulting threat becomes overwhelming (passing a self-regulation threshold), leading to the mobilization of a next level of defense. Thus, for participants who believe cancer is poorly treatable we expected that adding a self-affirmation procedure should lead to less death-related thoughts due to the mobilization of renewed defenses.

Method

Participants and Design

Forty-seven students from the University of Groningen and the Hanze University Groningen participated in exchange for partial course credit or 5 euros. Participants were randomly assigned to one of two conditions (no self-affirmation vs. self-affirmation) in a between subjects design. All participants were asked to think about cancer.

Procedure

The procedure was similar to that of Study 5.1. However, during this study the students were invited to participate in the laboratory (individual cubicles). The same cover story was presented to them. We added the question about treatability at the pretest. Self-affirmation was manipulated this time; participants were asked to complete a short questionnaire about their values. The cancer salience prime, delay tasks and death-thought accessibility measure were identical to Study 5.1. All the measurements were conducted by computer. Afterwards the experimenter carefully debriefed the participants.

Materials and Measurements

Pretest measurement. Participants were asked about the treatability of cancer: "How treatable is cancer according to you?" (with endpoints 1 [*not well treatable at all*] to 7 [*very well treatable*]) (M = 3.91, SD = 1.14). We also added some filler questions, which concerned health and illness.

Self-affirmation manipulation. All participants were asked to complete a short questionnaire about life domains (Steele & Liu, 1983; Tesser & Cornell, 1991). They were presented with six values: theory, economics, esthetics, social aspects of life, politics, and religion. All participants were asked to select a domain which they valued most, and a domain which they valued least. Next, all participants were presented with a questionnaire that consisted of 10 questions and participants could each time choose between two answers. In the self-affirmation condition participants could choose between an answer concerning their most important value versus an answer that was unrelated to their

most important value. In the no-affirmation condition participants could choose between an answer that was associated with their least important value versus an answer unrelated to their least important value.

Death accessibility. The same word completion task was administered as used in Study 5.1. Again, we added the scores on these six word fragments (M = 0.45, SD = 0.62).

Results

Self-Affirmation Manipulation

To check whether the self-affirmation manipulation was used by the participants as planned, we looked at participants' responses to the 10-item questionnaire. A one-way ANOVA was performed with self-affirmation manipulation as factor. The results showed a significant main effect, $F(1, 45) = 95.95$, $p < .01$, $\eta_p^2 = .68$. Participants in the self-affirmation condition chose significantly more the answer that matched their most important value (M = 7.17) compared to how often participants chose their least important value in the no-affirmation condition (M = 2.75).

Moderating Role of Treatability on Death-Related Thoughts

A two-way ANOVA was conducted to test whether perceptions of treatability of cancer influenced the relationship between the cancer prime and the self-affirmation manipulation. Self-affirmation manipulation was included as a factor and perceived treatability of cancer as a continuous variable. A significant two-way interaction was found on death-related thoughts, $F(1, 43) = 6.00$, $p < .05$, $\eta_p^2 = .12$. We computed the simple slopes separately for low (-2 SD below the mean) and high levels (+2 SD above the mean) of treatability (Cohen et al., 2003). For participants who perceived cancer as rather poorly treatable we found a significant effect of self-affirmation, $F(1, 43) = 7.00$, $p < .05$, $\eta_p^2 = .14$. Self-affirmation led to significantly less death-related thoughts (M = 0.20) compared to the no-affirmation condition (M = 1.14) (see Table 5.1). Our interpretation is that the induced open-

mindedness led to such a strong threat that was, subsequently, dealt with using renewed defenses.

Table 5.1 Cell means as a function of a cancer prime, self-affirmation, and participants' ideas about the extent to which cancer can be treated on death-thought accessibility, Study 5.2.

	treatability low	**treatability high**
no SA	*M* = 0.20	*M* = -0.20
SA	*M* = 0.20	*M* = 0.50

Note. Higher numbers reflect more death word completions.

For participants who perceived cancer as rather well treatable we found the opposite effect of self-affirmation; participants who were affirmed reported more death-related thoughts (*M* = 0.50) than participants who were not affirmed (*M* = -0.20), although the difference only approached significance, $F(1, 43) = 3.14$, $p = .08$, $\eta_p^2 = .07$. This pattern is consistent with the idea that the induced open-mindedness increased the threat to a level that could be tolerated.

Study 5.3

In Study 5.3 we presented participants with a text about cancer that stressed how difficult it is to treat cancer. We chose to use a text on the low treatability of cancer. The aim of Study 5.3 was not merely to replicate the findings of Study 5.2 by manipulating treatability this time, but to take it one step further. We also looked at the role of participants' preventive associations related to cancer (as assessed at pretest); whether they think they can prevent the occurrence of cancer (i.e., response efficacy in preventing cancer).

The intent was to first lead participants to believe that cancer is relatively untreatable so as to induce a potent threat. However, the potency of this threat may be lower among those who think that the risk of contracting cancer is small because they have strong preventive control. Thus, treatability concerns the seriousness of cancer while preventive control may concern the probability that one will get the

serious cancer. Thus, the association with death (i.e., the level of threat) is expected to be moderate when preventive control is high and severe when the preventive control is perceived to be low.

As outlined in Study 5.2, the moderate threat (in the case of high preventive control) can be averted adequately with self-regulatory defenses (i.e., effective suppression) and consequently participants should evidence low death-thought accessibility. Because adding a self-affirmation manipulation should induce open-mindedness (and a weakened suppression), an opportunity to self-affirm should, as it did in Study 5.2, result in participants reporting more death-related thoughts. In the case of low preventive control, the more substantial threat presented by the salience of cancer should mobilize defensive reactions that, however, will not be completely successful in blocking the threat (i.e., leaking defenses). Because adding a self-affirmation manipulation promotes open-mindedness, this may render the threat overwhelming (passing the self-regulation threshold) and motivate the use of a next level of defense, resulting in a decrease in death-related thoughts.

Method

Participants and Design

Seventy-two students from the University of Groningen and the Hanze University Groningen participated in exchange for partial course credit or 5 euros. All participants read a text about cancer, which emphasized the difficult treatability of cancer. Participants were randomly assigned to two different conditions (no self-affirmation vs. self-affirmation) of a between subjects design.

Procedure

After being welcomed to the laboratory (individual cubicles), the participants were told they were going to participate in supposedly several different studies that all revolved around the themes of health/illness and lifestyle/personality. First, some pretest measurements were taken, followed by the same self-affirmation procedure as used in Study 5.2. The threat manipulation consisted of a text about the severity and treatability of cancer. Afterwards some

delay tasks were presented. Just like in the previous studies participants were presented with the PANAS questionnaire, but instead of reading the neutral mustard text they were asked to draw a neutral object (i.e., a tree). Next, a death-thought accessibility measurement was presented. However, instead of completing word fragments participants were asked to read some words and write down the thoughts that came to mind. All the measurements were conducted by computer (i.e., except for the drawing exercise). Finally, the experimenter carefully debriefed the participants.

Materials and Measurements

Pretest measurement. To assess participants' thoughts about the possibility of preventing cancer we asked participants: "To what extent can you control whether you get cancer?" (endpoints 1 [*totally no control*], to 9 [*a little control*]) (M = 4.28, SD = 2.10). We also added some filler questions, which concerned health and illness.

Salience manipulation. Participants were presented with a text about the severity and treatability of cancer. The article was supposedly published by the Royal Dutch Cancer Society. The participants were told that the aim of the study was to determine their opinion about the article. Participants were presented with a text of one page, with a total of around 270 words. First, it was stated that cancer is the second leading cause of death in the Netherlands and soon will be the leading cause of death. Second, different kinds of cancer were mentioned. Third, the cause and treatability were addressed; it was said that "a maximum of 30% of the people, who are diagnosed with cancer, are cured."

Delay tasks. Just like in the previous studies participants completed the PANAS questionnaire. In addition participants were asked to draw a tree. They were given a white A4 sheet and twelve color pencils. It was stated that they could draw the tree however they wanted and they were given 5 minutes. On the computer screen they could see a little clock that showed how much time they had left and they were told that a soft bell-like-sound would indicate when there time was over.

Death accessibility. All the participants were presented with a word association task that was designed to measure the accessibility of death-related thoughts. Participants were presented with 15 words and were asked to write down the first thoughts that came up in their mind. Of the 15 presented words, 4 words could refer to death or to a neutral or happy event. For example the word "floral wreath," which could be seen as part of a funeral or as part of home decoration. The other three ambiguous words were: procession (e.g., this could refer to people who attend a funeral but also to people who are part of a carnival parade), case (e.g., in Dutch this could refer to a coffin or to a box for vegetables), and ashes (e.g., this could refer to cremation or to cigarette ashes). A rater coded the thoughts participants reported concerning these 4 ambiguous words. The thoughts which were exclusively related to death were coded as "1," while all other thoughts were coded as "0". Next we added these scores on all four measurements (M = 1.08, SD = 1.04).[20]

Results

Self-Affirmation Manipulation

Just like in Study 5.2 we checked whether participants performed the self-affirmation manipulation as intended. A one-way ANOVA was performed with self-affirmation manipulation as factor. The results showed a significant main effect, $F(1, 70) = 193.29$, $p < .01$, $\eta_p^2 = .73$. Participants in the self-affirmation condition choose significantly more the answer that matched their most important value (M = 7.41) compared to how often participants choose their least important value in the no-affirmation condition (M = 2.74).

[20] We did not include two additional ambiguous words in the final death-thought accessibility measurement. The word 'church bells' was excluded, because participants hardly mentioned any dead-related thoughts. In addition, the word 'black' was eliminated because it resulted in thoughts that were difficult to interpret, like 'dark' or 'dreary'.

Moderating Role of Perceived Preventive Control on Death-Related Thoughts

A two-way ANOVA was conducted to test whether the effect of self-affirmation on death-thought accessibility depended on participants' perception of control over getting cancer. Self-affirmation manipulation was included as a factor and perceived preventive control as a continuous variable. As predicted, a significant interaction was found, $F(1, 68) = 7.41$, $p < .01$, $\eta_p^2 = .10$. We computed simple slopes separately for low (-2 SD below the mean) and high levels (+2 SD above the mean) of response efficacy in preventing cancer (Cohen et al., 2003).

For the participants who perceived cancer as poorly preventable, we found that those who were affirmed had fewer death-related thoughts ($M = 0.43$) than participants who were not affirmed ($M = 1.41$). This effect of self-affirmation approached significance, $F(1, 68) = 3.02$, $p = .07$, $\eta_p^2 = .05$. Again, this suggests that the induced open-mindedness increased the threat which, in turn, was averted by a next level of defense. For the participants who perceived cancer as somewhat preventable we found that self-affirmation led to significantly more death-related thoughts ($M = 2.25$) compared to no self-affirmation ($M = 0.51$), $F(1, 68) = 9.42$, $p < .01$, $\eta_p^2 = .12$. This suggests that the induced open-mindedness led to a tolerable level of threat.

Study 5.4

Thus far, the current research focused on the connection between conscious reminders of cancer and death-related thoughts. However, in day to day life people will not always be explicitly confronted with cancer; most times people will not pay full attention to health messages on bill boards or ads in magazines that, for example, underline the importance of self-screening to detect cancer at an early state. Thus, messages are also often unconsciously or preconsciously perceived (Dehaene, Changeux, Naccache, Sackur, & Sergent, 2006; Kouider, Dehaene, Jobert, & Le Bihan, 2007). Therefore, in Study 5.4 we looked at the effect of unconscious cancer primes; do subliminal cancer primes

also engender suppressive reactions that are moderated by self-affirmation?

Until now, terror management research has found that mortality and cancer primes only result in suppression when people are aware of the threat (Arndt, Allen, & Greenberg, 2001; Arndt et al., 2007). A subliminal prime should therefore bypass this need for suppression and lead to the distal, symbolically oriented defenses typically found in terror management research (for a review, see Greenberg, Solomon, & Arndt, 2007). However, it is unclear whether this potential bypass of suppression from unconscious primes is independent of participants' personal associations pertaining to the threat (i.e., the treatability of cancer). When people perceive the treatability of cancer as low, do subliminal primes still not activate defensive self-regulations (like suppression of death-related thoughts or renewed defenses)? Previous research shows that differences in threat sensitivity strongly influence the way unconscious threats are processed (for an overview, see Li, Zinbarg, & Paller, 2007; Mathews & MacLeod, 1994), and consequently determine people's conscious experiences (Li, Paller, & Zinbarg, 2008). Thus, rather then expecting that subliminal primes do not lead to a threat that might motivate suppressive responses, we expect that they may do so for certain individuals in certain situations. In the present context, we expect that the level of suppression depends upon individual differences in perceived treatability of cancer.

In Study 5.4 we included both supraliminal cancer primes and subliminal primes in one design. Just like in Study 5.2 we measured people's perception of treatability of cancer. Self-affirmation manipulation was again used to induce open-mindedness. Although we predict that after both unconscious and conscious cancer primes, suppressive tendencies may be displayed, we do not simply expect the same outcomes for both types of cancer primes. Research has shown that the effects of subliminal and supraliminal primes can differ in strength with subliminal primes at times being more subtle (Higgins & King, 1981). Subliminal primes may prevent conscious associations that might increase the threat. In sum, it could be expected that subliminal primes result in a weaker level of threat.

Therefore we expected that for participants who perceive cancer as rather well treatable the level of threat induced by subliminal cancer primes may be sufficiently subtle that there is little need to display suppressive tendencies. Consequently, self-affirmation should have no effect on the level of death-related thoughts. For participants who perceive cancer as poorly treatable, however, we expected that activating thoughts of cancer outside of conscious awareness (i.e., the subliminal cancer) may lead to a moderate threat. This should result in the engagement of a suppression reaction, which given the moderate level of threat, should effectively reduce death-thought accessibility. However, providing an opportunity for self-affirmation may weaken the suppressive tendency and thus lead to higher death-thought accessibility (i.e., leaking defenses). For the supraliminal cancer primes we expected to replicate the findings of Studies 5.2 and 5.3.

Method

Participants and Design

Ninety-five introductory students from the University of Missouri-Columbia participated in exchange for partial course credit. Participants were randomly assigned to one of four conditions of a 2 (no self-affirmation vs. self-affirmation) x 2 (supraliminal cancer prime vs. subliminal cancer prime) between subjects design.

Procedure

After being welcomed to the laboratory (individual cubicles), the participants were told they were going to participate in several different studies on personality traits and decision making. First, participants were presented with a self-affirmation manipulation that concerned writing about one's most important value. Next, the cancer prime manipulation followed; either cancer was supraliminal primed by asking students to write about cancer, just like in Studies 5.1 and 5.2, or cancer was subliminally primed. Next, a word completion exercise was presented to measure the death-related thoughts. All the measurements, except the self-affirmation manipulation, were conducted by computer. The stimuli involved in the subliminal prime

task were presented on a 15-inch color monitor controlled by an IBM-compatible computer equipped with MediaLab (Empirisoft Corporation, 2002) display software. Within the MediaLab interface, DirectRT software synchronized the timing of the stimuli. Once all participants were finished the experimenter thoroughly debriefed them.

Materials and Measurements

Self-affirmation manipulation. All participants were asked to rank a list of 12 values and characteristics in order of personal importance (Cohen, Aronson, & Steele, 2000; Schmeichel & Martens, 2005). The list consisted of the following values and characteristics: artistic skills/aesthetic appreciation, sense of humor, relations with friends/family, spontaneity/living life in the moment, social skills, athletics, musical ability/appreciation, neatness/tidiness, physical attractiveness, creativity, business/managerial skills, and romantic values. After raking these values in order of importance, participants completed a brief writing assignment that composed the self-affirmation manipulation. Participants in the self-affirmation condition first indicated their most important value from the value-ranking form and then wrote a brief essay explaining why this value is important to them and described a time in their lives when it was particularly important. Participants in the no-affirmation condition indicated their ninth most important value and wrote a brief essay explaining why the value might be important to the average student. Participants were instructed to write for 5 minutes before moving on; the computer was programmed to automatically continue to the next item after 5 minutes.

Cancer manipulation. Next, the participants were exposed to the supraliminal or the subliminal cancer prime manipulation. The supraliminal prime consisted of the same two open-ended questions concerning participants' feelings and thoughts about cancer as posed in Studies 5.1 and 5.2. The subliminal prime consisted of a word relationship task. First it was explained that the word relation program would present two words on the computer screen and participants are to indicate whether the words are related by pressing the right or the left shift key. For example, if they saw the words *rose* and *flower*, they

were asked to press the right shift key to indicate that they are related, but if they saw the words *sneaker* and *fajita*, they were asked to press the left shift key to indicate they were not related. Four practice trails allowed participants to familiarize themselves with the procedure. All primes were presented on Times New Roman 14-point font in the center of the computer screen. The first and the third stimuli were the words for which participants were to judge the presence or the absence of a relationship. These words were provided with a forward and a backward mask, respectively, and were each displayed for 356 ms. The critical subliminal primes were presented between two mask words for 28 ms as in previous research (e.g., Arndt et al., 2007; Arndt, Greenberg, & Cook, 2002). In the subliminal prime condition, participants were exposed to 20 such trials and the word *cancer* presented between the two masks.

To provide the appropriate delay between the supraliminal prime and the dependent measures we also asked participants in this condition to complete the word relationship task after the open-ended questions about cancer. However, this time the words, *intense pain* were presented between the two masks. In addition, in the subliminal prime condition we asked participants to complete a writing assignment before completing the word completion task; participants were asked the same two open-ended as posed in the supraliminal prime condition, but the questions concerned intense pain instead of cancer. By adding the word completion task to the supraliminal prime condition and the open-ended questions to the subliminal prime condition we rule out the possibility that differences in tasks or in time explain the effects on the dependent variable.

Death accessibility. We used the word stem completion task to measure the accessibility of death-related thoughts. Participants are presented with 28 word fragments, 6 of which could be completed as a neutral or death-related word. This measure has been used successfully in many terror management studies (e.g., Greenberg et al., 1994). The death completions were BUR _ _ D (*buried* or *burned*), DE _ _ (*dead* or *deed*), M _ R _ ER (*murder* or *marker*), GRA _ _ (*grave* or *grape*), SK _ LL (*skull* or *skill*), and COFF _ _ (*coffin* or *coffee*). Death accessibility

scores were the total number or death-related word completions (*M* = 1.75, *SD* = 0.83).

Treatability of cancer. Just as in Study 5.2 we asked about the treatability of cancer; "How treatable do you think cancer is?" This time the items were not rated on a 7-point scale but on a 9-point scale and ranged from 1 (*totally not treatable*) to 9 (*very treatable*) (*M* = 5.53, *SD* = 1.67). We did not pose this question at pretest because of the sensitive nature of the subliminal primes.[21]

Manipulation check. During the debriefing participants were asked some questions to check their awareness of the subliminal prime in the word relationship task. They were asked to indicate how many words they saw on each display (each trial for which they were to make a relationship judgment). In addition, when they indicated that they saw more than two words, it was asked what word this might have been. Six participants indicated seeing three words, but only 1 participant guessed that the word was cancer. All other participants did not list any guesses. Thus, it seems that there was at least no retrospective awareness of the masked prime for all but 1 participant. In the following analyses we excluded this 1 participant who was aware of the masked prime. Thus the analyses are based on the responses of 94 participants.

Results

A three-way ANOVA was conducted to test whether perceptions of treatability of cancer influenced the relationship between the salience manipulation and the self-affirmation manipulation. Prime manipulation and self-affirmation manipulation were included as a factor and perceived treatability of cancer as a continuous variable. As predicted, a significant three-way interaction was found on death-related thoughts,

[21] To check whether the manipulations did not affect the answers of participants on the treatability question we conducted a two-way ANOVA. Prime manipulation and self-affirmation manipulation were included as a factor and treatability was the dependent variable. The results showed that both main effects and the interaction effect were not significant ($F < 2.6$, *n.s.*). Thus, we did not indicate any problem in including treatability as moderator in the analyses.

$F(1, 86) = 6.58$, $p < .05$, $\eta_p^2 = .07$. For supraliminally primed participants we found a significant two-way interaction between self-affirmation and treatability, $F(1, 40) = 4.31$, $p < .05$, $\eta_p^2 = .10$. We computed the simple slopes separately for low (-2 SD below the mean) and high levels (+2 SD above the mean) of treatability (Cohen et al., 2003). The contrast analysis showed the same pattern as found in Studies 5.2 and 5.3; for participants who perceived cancer as poorly treatable we found that self-affirmation led to (marginally) less death-related thoughts ($M = 0.74$) compared to the no-affirmation condition ($M = 1.69$), $F(1, 40) = 3.58$, $p = .07$, $\eta_p^2 = .08$. This suggests the activation of the next level of defense. For participants who perceived cancer as rather well treatable we found the opposite pattern; self-affirmation led to (marginally) more death-related thoughts ($M = 2.74$) compared to the no-affirmation ($M = 1.68$), $F(1, 40) = 3.36$, $p = .07$, $\eta_p^2 = .08$ (see Table 5.2). This suggests that the induced open-mindedness led to a higher but tolerable level of threat.

Table 5.2 Cell means as a function of the cancer prime (supraliminal or subliminal), self-affirmation, and participants' ideas about the extent to which cancer can be treated on death-thought accessibility, Study 5.4.

	supraliminal cancer prime		**subliminal cancer prime**	
	treatability low	**treatability high**	**treatability low**	**treatability high**
no SA	$M = 1.69$	$M = 1.68$	$M = 0.98$	$M = 2.22$
SA	$M = 0.74$	$M = 2.74$	$M = 2.07$	$M = 1.86$

Note. Higher numbers reflect more death word completions.

For subliminally primed participants we found no significant two-way interaction between self-affirmation and treatability, $F(1, 46) = 2.40$, $p = .13$, $\eta_p^2 = .05$. However, we did compute specific contrasts. For participants who saw cancer as poorly treatable, we found that a self-affirmation procedure led to more death-related thoughts ($M = 2.07$) compared to the no-affirmation condition ($M = 0.98$). This effect approached significance, $F(1, 46) = 3.85$, $p = .06$, $\eta_p^2 = .08$. This is

consistent with the idea that, even when participants are unaware of the cancer prime they engage suppression which is then weakened following self-affirmation. In addition, for participants who believed that cancer is rather well treatable we found no difference between self-affirmation (M = 1.86) and no affirmation (M = 2.22), $F(1, 46) = 0.54$, $p = .47$, $\eta_p^2 = .01$. Thus, it seems that the threat was so low, that no defenses were in action and inducing open-mindedness had no effect at all.

The results also showed a significant main effect of treatability on death-related thoughts, $F(1, 86) = 5.07$, $p < .05$, $\eta_p^2 = .06$. Participants who perceived cancer as poorly treatable reported significantly less death-related thoughts (M = 1.37) than participants who perceived cancer as rather well treatable (M = 2.13).

Discussion

Cancer and Death-Related Thoughts

The aim of the current research was to show that people's self-affirmational resources and perceptions about cancer influence the experienced threat (i.e., death-related thoughts) caused by thinking about cancer and the subsequent defensive efforts to cope with the threat. We focused on two specific kinds of perceptions, treatability of cancer and preventive control over contracting cancer, and reasoned that these associations determine how strongly cancer and death are linked and, thus, how strong the resulting threat is when a person is confronted with thoughts of cancer. The level of the threat, in turn, was posited to influence the suppressive or defensive self-regulatory actions taken. We proposed four subsequent states of self-regulatory defense; no defenses, effective defenses (i.e., suppression), leaking defenses, and the next level of defenses. We used self-affirmation to determine whether defensive regulatory processes came into play, with the premise that self-affirmation weakens initial suppressive tendencies (Steele, 1988). Thus, by comparing the presence or absence of self-affirmation we were able to see whether people were regulating death-related thoughts.

Before focusing exclusively on cancer primes and the role of individual beliefs concerning cancer, we compared thoughts about cancer in Study 5.1 with a general mortality prime and a control group. We focused in this study on understanding the general effects of cancer primes, and not yet on the specific effects of participants' personal beliefs about cancer. As in prior research (Arndt et al., 2007), the results showed that thinking of cancer resulted in fewer death-related thoughts compared to the death prime and the dental pain prime. This is consistent with the notion that the prospect of cancer arouses an especially robust suppression effort that persists beyond an initial delay, and motivates defensive self-regulatory actions to cope with the threat. However, self-affirmation did not have a significant effect in the cancer salience condition. We believe this may be because different processes come into play depending on the severity of peoples' beliefs about cancer. People who believe that cancer is moderately severe versus very severe display different levels of suppressive tendencies; combining the results for both groups could simply even out the effects and obscure detection of the influence of self-affirmation.

The findings of Studies 5.2, 5.3, and 5.4 supported the importance of including participants' beliefs about cancer in order to understand the underlying processes. Studies 5.2 and 5.4 showed that participants who believed cancer could be treated reacted with effective defenses (i.e., suppression) and, therefore, experienced few death-related thoughts. Self-affirmation weakened the defenses, and forced people to tolerate the threat (i.e., leaking defenses), as indicated by the increase in death-related thoughts. Participants who perceived cancer as poorly treatable could not successfully suppress the threat; the threat was simply too strong to be completely suppressed, which resulted in leaking defenses. Because self-affirmation forced people to be open-mined, it facilitated a more stark confrontation with the topic of cancer. The subsequent increase of the threat resulted in the activation of the next level of defense and, therefore, fewer death-related thoughts. The same pattern of results was found in Study 5.3 when we examined participants' beliefs about preventive control over cancer. Thus, although participants were provided with the information

that cancer is poorly treatable, their belief in the existence of effective preventive actions elicited an effect similar to that of believing that cancer can be cured. In sum, participants' beliefs about cancer are crucial to an understanding of the underlying processes.

The findings of Study 5.4 showed, in addition, that people's attempts to regulate death-related thoughts remained present even when participants were unaware of the cancer prime. All these results indicate that cancer and death-related thoughts are closely associated. However, strong motivational processes aim at keeping the resulting death concerns out of conscious awareness. Even when people are not explicitly aware of the cancer threat, they appear to display defensive tendencies to cope with the potential threat.

Self-Affirmation and Understanding Defensiveness

Use of self-affirmation enabled us to learn more about the underlying defensive tendencies. Self-affirmation has been shown to inhibit self-regulatory attempts to compensate for a threat by maintaining self-integrity through biasing information processing. This can result in painful awareness of threats associated with one's health (Sherman & Cohen, 2002, 2006). Whether people can tolerate this awareness or need the next level of defense depends on the initial level of threat. Below, we give an example which illustrates that use of self-affirmation provided information and insights that directed and even changed our interpretation of the results presented in the current manuscript.

The findings of Study 5.1 show that cancer primes result in suppressive tendencies. However, the different individual beliefs about cancer appear to elicit differential effectiveness of that suppression. For example, participants who perceived cancer as not so severe (owing to beliefs that cancer is somehow treatable or preventable), but who were not affirmed, reported low levels of death-related thoughts. This outcome could have led to the conclusion that participants were not threatened at all, and that there was no link in their minds between cancer and death. However, the use of self-affirmation suggests that this would be an incorrect conclusion; the addition of self-affirmation led to more death-related thoughts by forcing participants to be open-

minded. One plausible explanation for this is that participants who did not self-affirm were effectively suppressing death-related thoughts.

For participants who experienced a strong health threat (owing to beliefs that cancer is poorly treatable or preventable), we found high levels of death-related thoughts when they were not affirmed. Without applying self-affirmation, we might have concluded that the participants were simply accepting the threat. However, addition of self-affirmation decreased the number of death-related thoughts. This suggests that these participants were still displaying some (partly ineffective) defensive tendencies (i.e., leaking defenses); otherwise, self-affirmation should not have had any effect, and certainly not a lowering effect, on death-related thoughts.

In sum, self-affirmation proved a useful tool in unraveling whether and to what extent suppressive processes were engaged when participants were confronted with the thought of cancer. Self-affirmation even made it possible to infer that defensive tendencies still occurred when participants were unaware of a cancer prime. However, despite the very informative nature of self-affirmation, a potential shortcoming of the current research is that we did not directly measure the underlying defensive or suppressive tendencies. Future research should be aimed at explicitly measuring these suppressive tendencies.

Individual Beliefs About Cancer: The Underlying Concept

A central claim in the current research is that cancer may, perhaps ironically, spark a stronger need to suppress thoughts of death than the concept of death itself. We suggested that this may be the case because of the many different associations that people can have with cancer (Whitaker et al., 2008), making cancer a less abstract threat of death than the concept of mortality. We tested two specific associations in the current research, the treatability of cancer and the perceived preventive control over cancer. The distinction between the two associations is in line with theories on risk perception (Rogers, 1975); the threat of an illness depends on the seriousness of the condition (e.g., treatability) and the chances of contracting the illness (susceptibility, vulnerability, or, as in the present study, preventive

control). Perceptions of high treatability and strong preventive control both lower the perceived chances that the person will die from cancer. These beliefs pertaining to cancer determine the association between cancer and death. That is, believing that cancer can not be prevented or handled activates broader associative memory networks that are closely associated with death. Believing that cancer can be handled, however, does not activate people's associative network so strongly. Thus, the risks associated with cancer determine the extent to which death-related thoughts are activated.

In the domain of cancer, a lot more associations might influence the perceived threat associated with cancer. Possible associations are saying farewell to friends and family, anxiety for a painful death, and embarrassment at being the person who is dying. These associations may also determine the link between cancer and death-related thoughts. Cancer may also be related to suffering from cancer and anxiety for aversive medical procedures. These associations do not directly concern the link between cancer and death; they link cancer to a more general aversive state that is not necessarily connected with death. The question, therefore, remains which associations determine the link between cancer and death-related thoughts.

Subliminal Cancer Prime

Until now, findings on the priming of thoughts of death have suggested that mortality and cancer primes only result in suppression of death-related thought when people are aware of the threat (Arndt et al., 2001; Arndt et al., 2007). For example, in Arndt et al. (2007), subliminal primes for cancer led to immediate increases in death-related thoughts, suggesting the absence of initial suppression. The findings of Study 5.4, however, showed that when participants' personal beliefs about cancer were included they displayed suppressive tendencies when unaware of the cancer prime. As found in previous research, the results of Study 5.4 showed that participants' sensitivity to threats (e.g., cancer is seen as poorly treatable) influenced the way unconscious threats were processed (Li et al., 2007; Mathews & MacLeod, 1994). That is, when cancer was perceived as quite well treatable, we found no

effect of self-affirmation. This could induce the conclusion that the threat bypassed the need for suppression. The effects found for participants who perceived cancer as poorly treatable prevents this conclusion; we found that adding self-affirmation did have an effect: participants reported more death-related thoughts (i.e., self-affirmation weakened defensive efforts). This indicates that the need for suppression was not bypassed. Thus, the absence of an effect of self-affirmation when participants perceived cancer as poorly treatable is likely due to the fact that the threat was too subtle to activate the defenses. In sum, for certain individuals, suppression can occur for both subliminal and supraliminal cancer primes, and subliminal primes do not completely bypass the need for suppression. What could this mean?

Subliminal priming research is closely connected with automaticity research; this research indicates that the effects of subliminal primes signal the occurrence of automatic effects (Bargh & Chartrand, 2000). When this reasoning is applied to the current research, it may be stated that, when people are confronted with the prospect of cancer, the suppression of death-related thoughts tends toward an automatic process that is driven by individual differences in beliefs about the severity of cancer. Thus, while suppression generally seems to require mental effort and resources (e.g., Wegner, 1994), it appears that if the threat is severe enough (e.g., cancer is seen as poorly treatable), even unconscious elicitation of the threat may engage suppression efforts. The prospect of cancer, with all its terrifying implications, may present an example of such a threat. To our knowledge, no research until now has included individual beliefs about cancer in the examination of associations triggered by the priming of cognitions about cancer, and in general few researchers have looked at the link between cancer and death. Replication of the current findings and more thorough research on the automaticity and cognitive effort in the field of regulatory attempts are necessary to further understand these possibilities.

Future Research: Implications for Health Threats

Research in the domain of persuasive health communication suggests that an open-minded approach towards information facilitates behavior change (e.g., Harris, et al., 2007). However, Arndt et al. (2007) showed that suppression of death-related thoughts led to increased intentions to conduct self-screening; removing the potential source of anxiety (i.e., death) may help to facilitate a more productive response. Thus, it remains unclear what the link is between death-related thoughts and intentions to engage in health-related behaviors, such as getting screened for cancer. On the one hand, the idea exists that open-mindedly acknowledging a threat, in this case death-related thoughts, motivates people to change their behavior. On the other hand, the idea exists that experiencing more death-related thoughts disrupts the formation of intentions to act healthy. In sum, additional research is needed to show the implications of reminders of cancer (both conscious and unconscious), and consequently the acknowledgment of death-related thoughts, for people's actions and intentions to act healthy or to participate in screening.

Chapter 6. Summary and Discussion

Health messages are everywhere: television commercials, newspaper ads, websites. Almost all these messages are aimed at convincing people to stop doing things that are unhealthy (e.g., smoking tobacco, consuming alcohol) or start doing things that are healthy (e.g., exercising, consuming fruits and vegetables) by mentioning the negative outcomes of unhealthy habits. It is emphasized that people jeopardize their health and life. At the same time, people value good health and want to live a long and healthy life. Therefore, health messages can threaten people's self-conceptions of being sane and sensible individuals. That is, people are confronted with the fact that they act in ways that are inconsistent with their main values. Such inconsistency constitutes a self-threat. A self-threat creates an aversive psychological state that people are motivated to resolve. Self-affirmation Theory (Steele, 1988) proposes that people can display at least three reactions to handle the self-threat: 1) people can alter unhealthy habits or form intentions to change unhealthy habits; 2) people can react defensively to the health message; or 3) people can apply self-affirmation. In essence, self-affirmation refers to the generation of positive self-images which are unconnected with the threatening event. Self-affirmation weakens initial defensive strategies people use to handle a self-threat. When people are exposed to health messages in this open state of mind, they become painfully aware of the self-threat induced by the health message (e.g., Harris & Napper, 2005).

In the current doctoral thesis, it was examined how people handle self-threats in the domain of health. Self-affirmation was used as a diagnostic tool to help to identify the ways in which people cope with a self-threat. Self-threats were examined in three different ways: 1) the interplay between self-threats and involvement was examined, 2) individual differences in self-affirmation were examined, and 3) self-threat in relation to a specific health threat, cancer, was examined. First, in the current chapter, a summary of the main findings of the empirical chapters is presented. Then, I discuss how the current research relates to and has implications for other fields of research.

Finally, possible practical implications of the current research are discussed.

Summary of the Main Findings

Part 1: Health Messages and Involvement

In the first empirical chapter, I focused on the role of involvement. The findings of two studies showed that type of involvement (value versus outcome) and level of involvement (weak versus strong) determine how people deal with a threatening health message. In both studies, participants read a story about the negative consequences of insufficient daily fruit and vegetable intake. In Study 2.1, value-involvement and self-affirmation were manipulated. In Study 2.2, outcome-involvement and self-affirmation were manipulated. The self-affirmation procedure consisted of very positive feedback on a test that supposedly predicted success in social relations and in the area of work. The results showed that only participants who valued health to a moderate extent handled the self-threat by reacting defensively. This is inferred from the fact that adding a self-affirmation procedure increased participants' intention to consume sufficient fruits and vegetables. When strong levels of value-involvement were present participants did not discard valuable health information by reacting defensively; the topic of health was simply too closely connected with their core value of maintaining good health, so the health message could not be ignored. Consequently, participants formed an intention to act in accordance with the recommendations, independent of self-affirmation.

When outcome-involvement was concerned no effect of self-affirmation was found. This type of involvement does not address people's self-defining values, which prevents them from reacting defensively. In sum, the findings of both studies show that self-affirmation can only be expected to increase persuasion when people's personal values are in play – but only to a moderate extent.

In the study reported in Chapter 3, I examined whether intentions formed immediately after a self-affirmation procedure were predictive of actual behavior after four weeks. Should this not be the case, the scientific value of all studies on self-affirmation in persuasion

would be limited. To be able to generate defensiveness and, thus, effects of self-affirmation, value-involvement as an individual difference was used. The self-affirmation procedure consisted of a writing assignment; participants in the affirmation condition were asked to write for a few minutes about their most important value in life. The health message again concerned the negative health outcomes of insufficient fruit and vegetable intake. Next, participants reported their intentions to eat sufficient fruits and vegetables. After one week and four weeks, participants completed self-reports of fruit and vegetable intake.

The results showed that self-affirmation led to less defensiveness immediately after the confrontation with the message, and that this effect manifested itself in actual behavior after four weeks. That is, when participants were moderately involved, adding self-affirmation increased their intentions to eat sufficient vegetables and their actual vegetable consumption after four weeks. As in Chapter 2, no effect was found of self-affirmation when health was top priority. Again, this indicates that when people's values are top priority they do not use defensive reactions to handle the self-threat. With regard to fruit consumption no effect of self-affirmation was present. This may be because fruit is seen as easier to consume (it is sweet and needs almost no preparation), while vegetables are more difficult to consume (they are mostly bitter and require more preparation) (Trudeau, Kristal, Li, & Patterson, 1998). Previous research has shown that especially confrontation with difficult behaviors results in defensive information processing (e.g., Fry and Prentice-Dunn, 2005). This suggests that the ease of fruit intake prevents information defensiveness from occurring, and, consequently, self-affirmation procedures have no effect on persuasion. In sum, self-affirmation leads to genuine intentions, but the effect of self-affirmation depends on people's level of value-involvement and on the difficulty of the behavior.

Part 2: Individual Differences in Self-Affirmation

In the studies reported in Chapter 4, I aimed to answer the question whether people can affirm themselves cognitively. In four studies I

aimed to construct a scale to measure people's cognitive self-affirmation inclination and to take the first steps in validating this scale. The inclination to use positive self-images when the self is threatened is defined as cognitive self-affirmation inclination. Study 4.1 was a cross-sectional study among smokers; the findings showed that people with a strong cognitive self-affirmation inclination perceived more negative consequences from smoking. This suggests an open-minded view, as commonly found in studies which include self-affirmation manipulations. Study 4.2 showed in a test-retest analysis the stable and reliable character of the cognitive self-affirmation inclination scale. In addition, cognitive self-affirmation inclination was positively related to the number of self-reported positive thoughts during the reading of a threatening message. In Studies 4.3 and 4.4 I manipulated the level of self-threat by presenting all participants with a health message on the negative outcomes of experiencing too much stress. Half of the participants read a text that underlined the severity of these consequences (strong self-threat), while the other half read a text that was constructed to be moderately threatening. The findings of Study 4.3 showed that cognitive self-affirmation inclination led to the same pattern of persuasion as found in earlier studies on self-affirmation manipulations when the threat was moderate. In Study 4.4 I added a self-affirmation manipulation; as in the studies reported in Chapter 2, the manipulation consisted of positive feedback on a bogus test. The results showed that a self-affirmation manipulation did not have any effect for participants with a strong self-affirmation inclination, probably because they already had access to self-generated positive self-images. In addition, the findings could not be explained by self-esteem. In sum, the study findings reported in Chapter 4 show the stability, meaning, and effects of a new scale designed to measure an individual's cognitive self-affirmation inclination.

Part 3: Health Messages and Cancer

In the studies reported in Chapter 5 I focused on a specific health outcome, cancer. The aim was to show that perceptions pertaining to cancer are crucial in the way people handle death-related cognitions. A

cancer prime consisted of a short writing task; participants wrote down what they thought would happen to them if they contracted cancer or had cancer. Self-affirmation was induced in different ways. In Study 5.1 cognitive self-affirmation inclination was assessed. In Studies 5.2 and 5.3 self-affirmation was manipulated by asking participants to complete a questionnaire about their most important value. In Study 5.4 it was manipulated by asking participants to write about their most important value. The general idea was that different perceptions of cancer lead to different levels of threat because they lead to different associations between cancer and death. When this association is multifaceted and strong, the threat of cancer is high and subsequent defensive or suppressive reactions may be mobilized to lower the threat. Self-affirmation was used to detect these defensive reactions.

Study 5.1 was designed to assess the general effect of self-affirmation when participants were primed with cancer and to relate my procedures and materials to those used in earlier terror management studies. The results showed that cancer primes generally led to suppression of death-related thoughts. Studies 5.2 and 5.4 were focused on the influence of perceptions of the treatability of cancer. In Study 5.3 treatability was manipulated and I looked at the perceptions of the preventability of cancer. In Study 5.4 cancer was also subliminally primed. The findings of all three studies showed that when participants believed cancer could be handled (i.e., cancer is preventable or curable) they suppressed death-related thoughts. This is inferred from the fact that adding a self-affirmation procedure increased the number of reported death-related thoughts. However, when cancer was perceived as difficult to handle, the threat was too potent to be suppressed effectively (i.e., increase in death-thoughts). In addition, the results showed that participants also regulated death-thoughts when they were unaware of the cancer prime. Thus, people’s perceptions of cancer determine the regulatory processes that they use to cope with the threat caused by the association of cancer with death.

Above is a summary of the main findings of the studies reported; below, I discuss how the present doctoral thesis relates to various themes in persuasive health research.

Theoretical Implications

What Happened to Fear?

Traditionally, the emphasis of studies about persuasive health communication has mainly been on the role of fear or physical threat. See, for example, classic fear appeal theories such as the Drive Reduction Model (Hovland, Janis, & Kelley, 1953), Protection Motivation Theory (Rogers, 1983), and Parallel Response Model (Leventhal, 1970). In the current doctoral thesis I did not consider the role of fear at all. I propose that people's primary motive for acting healthy and changing unhealthy habits is not to down-regulate fear, but to handle the self-threat. Our main proof that a self-threat was central in our persuasive effects comes from the influence of self-affirmation. After participants were affirmed, they no longer needed to process the information defensively. This implicates that the motive to defend was primarily related to their selves. The results of the study reported in Chapter 3 further show that the self-affirmation effect was not limited to immediate intentions, but extended to actual behavior. The idea that self-threat motivates behavior change is congruent with Social Cognitive Theory (Bandura, 1986). In addition, the emotional experience of a self-threat (self-evaluative emotions) has been shown to be the strongest predictor of quitting activity among smokers (Dijkstra & Buunk, 2008), even when fear is controlled for (Dijkstra & Den Dijker, 2005). Thus, it is plausible that a self-threat can be a powerful motivator.

It would be awkward, nevertheless, to completely deny the occurrence of fear in the present studies, because fear seems so closely related to negative health outcomes. Negative health outcomes that are relevant to a person can cause fear when important goals are threatened. However, it is inherent in persuasive health messages that people somehow play a role in the existence of the threat; they are held responsible for the health outcomes. This aspect of health messages

relates both relevant negative outcomes and fear to the self. Thus, the person not only inflicts objective and feared negative outcomes on him- or herself, but he or she also behaves in a way that induces fear. In this conceptualization, fear is another negative outcome the person is responsible for, which further increases the self-threat.

From an experiential point of view, the quality of the aversive experience, owing to being confronted with possible negative outcomes of one's own behavior, might depend on the momentary focus of attention. When the focus is on the suffering and the negative outcomes, fear might be the main experience. When the focus is on the causes of the negative outcomes and the behavioral solution, self-threat might be the main experience. It is possible that in the present studies our messages made participants focus more on the causes and solutions, leading to a dominant role of self-threat. Future research is needed to unravel the relationship between fear and self-threat; and to determine whether my assumptions withstand empirical tests.

Self-Affirmation

Self-affirmation was included in all studies of the current doctoral thesis. However, the manipulations differed substantially. In the studies reported in Chapter 2 people were given very positive feedback on a bogus personality test, while in the study presented in Chapter 3 people were asked to write about their most important value. In Studies 5.2 and 5.3 people were asked to complete a questionnaire about their most important value. The latter is the most commonly used manipulation of self-affirmation (McQueen & Klein, 2006). In the studies reported in Chapter 4 and in Study 5.1, I showed that people can also affirm themselves cognitively. Thus, I showed that people differ in the extent to which they use positive self-images to affirm themselves when presented with a threatening health message.

These diverse manipulations had the same effects. For example, in Study 2.1 and in the study reported in Chapter 3, the same effects occurred when value-involvement was considered, despite the use of different manipulations. In addition, the same effects were found in Study 5.3, in which participants were asked to write about values, as in

Study 5.4, in which participants were asked to complete a questionnaire. Also the studies reported in Chapter 4 showed the same effects of diverse ways to measure or induce self-affirmation; in Studies 4.3 and 4.4, I showed that a self-affirmation manipulation that provided people with positive feedback had the same effects as when people spontaneously used positive self-images. Because the same effects were found, it can be proposed that all refer to the same underlying process, the use of positive self-images.

Traditionally, self-esteem is portrayed as an important factor in self-affirmation (e.g., McQueen & Klein, 2006; Sherman & Cohen, 2006). However, the findings of the current doctoral thesis do not provide evidence for this point of view. The effects found in Chapter 4 on cognitive self-affirmation inclination could not be explained by self-esteem. In addition, the cognitive self-affirmation scale showed the same effect on persuasion as the more traditional self-affirmation manipulations. These results prevent the conclusion that self-esteem is the underlying mechanism of self-affirmation.

Figure 6.1 portrays my model of the relationship between self-esteem and self-affirmation. People have a reservoir of standing resources that they can use in the face of a threat to their self-integrity (Steele, Spencer, & Lynch, 1993). The standing resources refer to stored self-images in self-memory (Rogers, Kuiper, & Kirker, 1999). In my present conceptualization, self-esteem is a general evaluation of the self based on the information stored in self-memory. Thus, self-esteem is not the use of positive self-images but a global conclusion about the self. It is, however, the actual and active use of one's positive self-images that has the self-affirmative effects.

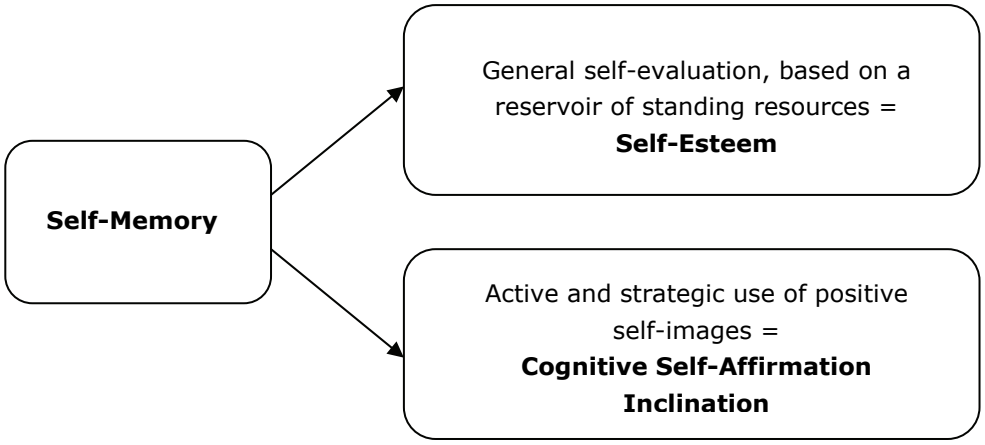

Figure 6.1 Schematic model of the relationship between self-affirmation and self-esteem.

Use of the concept of self-memory causes the relationship between self-affirmation and self-esteem to become clearer. I propose that self-affirmation and self-esteem originate from the same source (from the self-memory) and, therefore, show some overlap. However, the concepts have unique aspects that work separately and have separate effects.

Levels of Self-Threat

In general, the positive effects of self-affirmation on persuasion were emphasized in earlier studies in which self-affirmation manipulations were used (for overviews, see Harris & Napper, 2005; McQueen & Klein, 2006). In the current doctoral thesis this effect was also prevalent in several studies. For example, in Study 2.1, it was found that for participants who were made to believe that health is important (but not top priority), adding a self-affirmation procedure increased their intention to consume sufficient fruits and vegetables. However, self-affirmation did not increase persuasion in all empirical studies described in the current doctoral thesis. Instead, a much more diverse picture emerges of the effect and role of self-affirmation in the domain of health persuasion. I also showed that self-affirmation can have no

effect at all (e.g., Study 2.2) or can lead to more suppression of death-related thoughts (e.g., Study 5.2).

I propose that the reason why these diverse effects emerged may be the substantial differences in the presented studies concerning the level of self-threat that was induced and the availability of solutions to restore the self. Self-threats and solutions were influenced by the individual differences that were included (e.g., level of value-involvement, level of perceived treatability of cancer), by the different levels of severity of health outcomes that were manipulated (e.g., experiencing stress results in moderate versus very severe outcomes), and by the health domains used (e.g., insufficient fruit and vegetable intake, experiencing stress, having cancer).

In some cases, self-affirmation did not have an effect on outcomes. For example, in Study 2.2, self-affirmation had no effect when levels of outcome-involvement were manipulated. Outcome-involvement does not concern people's core values; therefore, the self is less directly involved. Consequently, no defensive regulation is needed. This means that self-affirmation simply had no defenses to lower. In the study reported in Chapter 3, self-affirmation also did not have an effect, probably for another reason. Although moderately involved participants were defensive about vegetable consumption, they were not defensive about fruit consumption. This may be explained by the ease of the behavior. When the behavioral solution to avert the actual threat is easily available, the attractiveness of using this option to lower a self-threat is clear. In Chapters 2 and 3 I also present findings that show no effect of self-affirmation. That is, when value-involvement was high (i.e., health was top priority for participants), self-affirmation did not influence the outcomes, probably again for another reason. In this case, it is possible that no defenses were raised because the information concerned participants' top priority, and holding off information about one's top priority may not be an available response. Again, self-affirmation had no defenses to lower. Thus, while it is stressed in the literature that self-affirmation fosters threat acceptance, I found several cases that showed no effect of self-

affirmation. This could not be explained simply by a lack of statistical power or ineffective manipulations.

In one study self-affirmation even resulted in increased defensiveness. This can be observed in the studies reported in Chapter 5; participants were confronted with a fatal disease and at the same time they believed that the disease could not be prevented in any way (Studies 5.2, 5.3, and 5.4). Again, self-affirmation weakens regulatory efforts, making people painfully aware of the threat. However, this time the threat was too strong to accept. The result was a renewed effort to handle the threat using defensive regulations. This effect of self-affirmation was documented when exploring death-thought accessibility, and not intention formation. However, Dijkstra (2009) reports the same defensive effect of self-affirmation on intention.

In conclusion, self-affirmation does not always enhance persuasion, as is sometimes suggested in studies in which self-affirmation manipulations were used. Future research may systematically disentangle the conditions under which self-affirmation leads to more, to no, or to less threat and persuasion.

Practical Implications

In the literature, self-affirmation is portrayed as the procedure or technique that enhances persuasion in general (e.g., Harris et al., 2007). However, the findings of my studies show that self-affirmation is not necessarily effective in increasing persuasion or in making people tolerate scary thoughts (i.e., death-related thoughts). Although indications have been found in previous research that self-affirmation is not always effective (e.g., Fry & Prentice-Dunne, 2005) or can even backfire (e.g., Reed & Aspinwall, 1998) in the domain of health, this has not been given much attention. In the current doctoral thesis explicit attention was paid to the possibility that self-affirmation can be ineffective; the findings of the study reported in Chapter 3 show that adding self-affirmation when health is top priority has no impact on actual behavior change. The findings of the current doctoral thesis also show that self-affirmation can lead to less open-mindedness; the findings presented in Chapter 5 suggest that addition of self-affirmation

induces suppression of death-related thoughts when people's memory network concerning health outcomes is too strongly activated (e.g., Study 5.2 – cancer was seen as poorly treatable). Therefore, I believe that self-affirmation is a procedure that should be applied carefully in persuasion.

I showed that self-affirmation is effective mainly when moderate threats are presented to participants. In this case it leads to increased intentions to act healthy and to engage in more healthy behavior. In the case of weak threats or strong threats, addition of self-affirmation has no effect. In these cases, however, self-affirmation also does not seem to interfere with persuasion. Only when threats are very strong (i.e., cancer is seen as poorly preventable or treatable) is there a chance that self-affirmation may backfire. Thus, when self-affirmation is used to increase persuasion, this should not be in areas or topics that are extremely scary or threatening.

The question remains how self-affirmation should be used in daily life. To my knowledge, no researchers have come up with suggestions for how to use it in health campaigns. The findings of the current studies show that diverse self-affirmation procedures can increase persuasion. In essence, recipients should be invited to think about a positive self-image. This might be done by asking a question: "Please think a moment about some accomplishment you have had," or "Please take a moment to think about what you stand for in life," or by giving general positive feedback: "The fact that you read this means that you are not the kind of person that avoids important issues." It is a challenge to find a feasible means of inducing self-affirmation outside the laboratory.

Self-affirmation does not necessarily need to be included in health campaigns to make them convincing. A more straightforward recommendation would be to prevent participants from displaying defensive reactions. This may be achieved by convincing people that health is a top priority in life; when values are top priority, defensiveness is absent (see Study 2.1 and Chapter 3). This may, for example, be accomplished by adding a short statement to a physician's health message that health is a top priority in life. Future research is

necessary to test how exactly messages should be framed when they are used outside laboratory.

Concluding Remarks

The findings of the present doctoral thesis show that self-integrity maintenance is a key motive in people's choice of ways to cope with health messages. Stressing of negative health outcomes causes an aversive psychological state that people are motivated to reduce. In short, the findings of the present dissertation show that the extent to which health messages induce a self-threat determines how people will try to cope with the threat at hand. Self-affirmation is a useful tool to unravel the underlying defensive processes. The focus on the self in the domain of health is a perspective that tells us much about the way health messages affect people; accordingly, this perspective deserves more attention in research on persuasive health communication.

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Nederlandse Samenvatting (Summary in Dutch)

Overredende gezondheidsteksten, die als doel hebben om mensen te overtuigen hun ongezonde gewoonten te veranderen, zijn alom aanwezig in de westerse wereld. Voorbeelden van gezondheidsboodschappen zijn televisiereclames die de negatieve gevolgen van roken benadrukken of websites over de potentiële gevolgen van onveilige seks. Al deze boodschappen hebben met elkaar gemeen dat ze mensen herinneren aan de gezondheidsrisico's die veroorzaakt worden door hun eigen gewoonten. Gezondheidsboodschappen herinneren mensen dus aan de gezondheidsrisico's die ze over zichzelf afroepen. Ondanks dat een goede gezondheid heel belangrijk wordt gevonden, gedragen mensen zich ongezond (Persson, Engström, Rydén, Larsson, & Sullivan, 2005). Deze inconsistentie tussen de waarden van mensen (e.g., gezondheid is belangrijk) en feitelijk gedrag (e.g., gedragingen die gezondheid in gevaar brengen, zoals roken of onveilige seks) veroorzaakt een aversieve psychologische toestand en kan worden beschouwd als een zelfbedreiging (Steele, 1988). Mensen zijn gemotiveerd om deze zelfbedreiging weg te nemen en hun zelfintegriteit te herstellen. De kern van dit proefschrift is onderzoek naar zelfbedreiging; zowel de gezondheidsrisico's die de zelfbedreiging veroorzaken als de adaptieve reacties die het gevolg zijn van de zelfbedreiging worden bekeken.

Gezondheidsboodschappen en Zelfbedreigingen

De zelfbevestigingstheorie (Steele, 1988) stelt dat mensen op zijn minst drie opties hebben om met een zelfbedreiging om te gaan, namelijk: 1) mensen kunnen hun ongezonde gedrag veranderen of een intentie formeren om hun ongezonde gedrag te veranderen, 2) mensen kunnen de gezondheidsboodschap defensief verwerken, of 3) mensen kunnen zelfbevestiging toepassen. De eerste optie lijkt het meest logisch en voor de hand liggend. Mensen kunnen bijvoorbeeld echter zo verslaafd zijn aan het roken van sigaretten dat stoppen met roken geen optie is. Het gevolg is dat men veelal defensief reageert (e.g., Liberman & Chaicken, 1992). Dat wil zeggen dat mensen de informatie niet

objectief lezen, ontkennen dat de gezondheidsboodschap waarheidsgetrouw is, of tegenargumenten verzinnen. Kortom, mensen negeren informatie die potentieel zeer belangrijk voor hen kan zijn. De zelfbevestigingstheorie (Steele, 1988) stelt echter dat mensen nog een derde optie hebben om met een zelfbedreiging om te gaan en het gevoel van zelfintegriteit te herstellen, namelijk zelfbevestiging. De kern van zelfbevestiging is dat belangrijke positieve zelfbeelden worden opgeroepen die niet gerelateerd zijn aan de bedreiging. Manipulaties van zelfbevestiging bestaan bijvoorbeeld uit het geven van positieve feedback aan mensen over hun sociale vaardigheden. Voor veel mensen is dit een belangrijke waarde in het leven en deze waarde is tevens niet gerelateerd aan gezondheid (McQueen & Klein, 2006). Zelfbevestiging doet mensen realiseren dat hun eigenwaarde niet afhangt van de evaluatieve implicaties van de onmiddellijke situatie. Het resultaat van zelfbevestiging is dat mensen niet langer defensief reageren op een gezondheidsboodschap, maar juist met een open houding (e.g., Sherman & Cohen, 2002, 2006). Kortom, zelfbevestiging zorgt ervoor dat mensen zich richten op belangrijke waarden die niet gerelateerd zijn aan de dreiging. Het gevolg is dat mensen hun eigenwaarde behouden zonder defensief te hoeven reageren.

Zelfbevestiging en Overreding

In onderzoek naar overredende communicatie worden mensen altijd geconfronteerd met een dreiging op het moment dat een open houding is geïnduceerd middels zelfbevestiging. Het resultaat van de open houding is een toename in de acceptatie van bedreigende gezondheidsinformatie. Onderzoek laat bijvoorbeeld zien dat toevoeging van zelfbevestiging voorafgaand aan een tekst over de negatieve gevolgen van overmatige alcoholconsumptie leidt tot een sterkere intentie om minder alcohol te consumeren (Harris & Napper, 2005). Deze open houding komt niet voort uit het gegeven dat men de dreiging trivialiseert. Er zijn namelijk duidelijke indicaties dat zelfbevestiging mensen juist pijnlijk bewust maakt van een dreiging. Harris, Mayle, Mabbott, en Napper (2007) laten bijvoorbeeld zien dat de toevoeging van zelfbevestiging leidt tot een toename van negatieve

emoties bij rokers ten opzichte van roken. Tevens laat Dijkstra (2008) zien dat zelfbevestiging leidt tot een meer negatieve zelfevaluatie. Kortom, zelfbevestiging maakt mensen toenemend bewust van een dreigende boodschap.

Een centrale aanname is dus dat zelfbevestiging mensen forceert om een zelfbedreiging onder ogen te zien door initiële defensieve reacties te verhinderen. De consequentie is dat na de toevoeging van zelfbevestiging mensen nog steeds een manier moeten vinden om met de zelfbedreiging om te gaan. Wederom hebben mensen verscheidene opties beschikbaar. In het huidige proefschrift richt ik me echter op één specifieke optie, namelijk op intentieformatie.

Door zelfbevestiging toe te passen kan worden vastgesteld of er defensieve processen spelen. Dit wil zeggen dat zelfbevestiging alleen een effect heeft op overreding of op gedachten als mensen in enige mate defensief reageren op een zelfbedreiging. De focus in het huidige proefschrift ligt op dreigingen in het domein van overredende communicatie.

Algemeen Overzicht

Dit proefschrift richt zich op de manieren waarop mensen met een zelfbedreiging om kunnen gaan. In vier hoofdstukken focus ik me op de achterliggende processen die er spelen als mensen een gezondheidsboodschap lezen. Zelfbedreigingen worden bestudeerd op drie verschillende manieren. Als eerste wordt de link tussen gezondheidsboodschappen en betrokkenheid onderzocht (Hoofdstuk 2 en 3). Ten tweede wordt een individueel verschil in zelfbevestiging onderzocht (Hoofdstuk 4). Ten slotte heb ik een specifieke gezondheidsdreiging onderzocht, namelijk kanker (Hoofdstuk 5). In alle hoofdstukken wordt zelfbevestiging toegepast.

Deel 1: Gezondheidsboodschappen en Betrokkenheid

Binnen overredende communicatie is de rol van betrokkenheid erg belangrijk. Er zijn twee soorten betrokkenheid, namelijk waardebetrokkenheid en uitkomstbetrokkenheid (Johnson & Eagly,

1989). Waardebetrokkenheid draait om de associatie tussen het onderwerp van een boodschap en de waarden van mensen. In het domein van gezondheid houdt dit in dat iemand die veel waarde hecht aan gezondheid sterk betrokken is bij een gezondheidsboodschap omdat gezondheid een zelfdefiniërende waarde is. Uitkomstbetrokkenheid draait juist om de associatie tussen de boodschap en de doelen of gewenste uitkomsten van mensen. In het domein van gezondheid betekent dit dat een gezondheidsboodschap wel of niet van toepassing is op iemand vanwege een objectieve relatie tussen de gezondheidsuitkomsten en iemands gedrag (e.g., een boodschap over teelbalkanker is niet relevant voor een vrouw).

In Hoofdstuk 2 is onderzocht wat het effect is van beide soorten betrokkenheid in de context van bedreigende gezondheidsboodschappen. In twee experimenten werd ofwel waardebetrokkenheid (matig versus hoog) of uitkomstbetrokkenheid (wel versus niet) gemanipuleerd. Daarnaast ondergingen de deelnemers een zelfbevestigingsmanipulatie. De gezondheidsdreiging bestond uit een tekst over de negatieve gevolgen van onvoldoende groente- en fruitinname. De resultaten lieten zien dat alleen bij een matige waardebetrokkenheid het lezen van de bedreigende tekst leidde tot een defensieve reactie. Dit kan worden afgeleid uit het feit dat toevoeging van zelfbevestiging leidde tot een toename van de intentie van deelnemers om meer groente en fruit te gaan eten. Wanneer gezondheid topprioriteit was voor deelnemers reageerden ze niet met defensieve reacties; gezondheid wordt gewoonweg te belangrijk gezien om de gezondheidsboodschap te negeren. Zodra uitkomstbetrokkenheid saillant was had zelfbevestiging geen enkel effect. Dit type betrokkenheid draait namelijk niet om de zelfdefiniërende waarden van deelnemers en daarom heeft men niet de neiging om defensief te reageren. Concluderend kan worden gesteld dat Hoofdstuk 2 laat zien dat zelfbevestiging alleen kan leiden tot een toename in overreding als mensen hun zelfdefiniërende waarden centraal staan. Echter, de waarden dienen geen topprioriteit te hebben, omdat men dan zo'n

directe zelfbedreiging ervaart waardoor de informatie defensief wordt verwerkt.

Hoofdstuk 3 had als doel om te testen of een toename in intenties, veroorzaakt door de toevoeging van zelfbevestiging (voor een overzicht, zie Harris & Napper, 2005), ook leidt tot daadwerkelijke gedragsveranderingen. Het kan immers zo zijn dat mensen een verhoogde intentie formuleren om op een makkelijke manier van het nare gevoel af te willen komen dat opgeroepen is door een zelfbedreiging. Dit houdt in dat mensen een intentie formeren maar niet daadwerkelijk van plan zijn om hun gedrag aan te passen. Overreding werd dit keer dan ook niet alleen gemeten door de deelnemers te vragen naar hun intentie om zich te gaan gedragen overeenkomstig de aanbevelingen genoemd in de gezondheidsboodschap (zoals in Hoofdstuk 2), maar ook door werkelijke gedragsverandering te meten (na één week en na vier weken). Waardebetrokkenheid werd vastgesteld door de deelnemers te vragen hoeveel belang ze hechten aan gezondheid. De gezondheidsboodschap bestond uit dezelfde tekst over de nadelige gevolgen van onvoldoende groente- en fruitconsumptie als gebruikt in Hoofdstuk 2. Direct na het lezen van deze boodschap werd naar de intentie gevraagd om voldoende groente en fruit te consumeren. Na één week en na vier weken vulden de deelnemers een zelfrapportage vragenlijst in betreffende hun werkelijke groente- en fruitconsumptie.

De resultaten lieten zien dat toevoeging van zelfbevestiging leidde tot een toename in de intentie om groente en fruit te consumeren; en deze verminderde defensiviteit voorspelde ook daadwerkelijk gedrag. De resultaten voor groenteconsumptie versus fruitconsumptie verschilden. Voor groente lieten de resultaten zien dat bij een matige waardbetrokkenheid de toevoeging van zelfbevestiging leidde tot een toename in groenteconsumptie. Zodra gezondheid topprioriteit was, lieten de resultaten zien dat er geen effect was van zelfbevestiging (net als in Hoofdstuk 2); gezondheid wordt gewoonweg te belangrijk gezien om de gezondheidsboodschap te negeren. Voor fruitconsumptie vond ik geen effect van zelfbevestiging. Dit kan worden

veroorzaakt door het feit dat het eten van fruit makkelijker is dan groente. Fruit is namelijk zoeter en eenvoudig te bereiden. Groente is daarentegen meestal bitter en vereist meer bereiding (Trudeau, Kristal, Li, & Patterson, 1998). Het gemak van fruitconsumptie verhindert het optreden van defensieve processen en dus hebben zelfbevestigingsprocedures geen effect. Concluderend kan worden gesteld dat zelfbevestiging leidt tot een toename in daadwerkelijke intenties om ongezonde gewoonten te veranderen. Dit effect hangt echter af van de mate van waardbetrokkenheid en de moeilijkheidsgraad van het uit te voeren gedrag.

Deel 2: Een Individueel Verschil in Zelfbevestiging

De meeste onderzoeken naar zelfbevestiging concentreren zich op het meten van reacties op extern toegediende zelfbevestigingsprocedures. Het doel van Hoofdstuk 4 was om te laten zien dat mensen zichzelf cognitief kunnen bevestigen (i.e., cognitieve zelfbevestigingsneiging). Ik definieer het actieve gebruik van positieve zelfbeeldherstellende beelden, wanneer men wordt bedreigd, als de cognitieve zelfbevestigingsneiging. Voorbeeldvragen zijn: "Ik merk dat ik sommige dingen heel goed heb gedaan," en "Als ik iets heb gedaan waar ik ontevreden over ben, zeg ik tegen mezelf dat ik niet alles verkeerd doe." Dit gebruik van positieve zelfbeelden zou net als een zelfbevestigingsmanipulatie moeten leiden tot het wegnemen van defensiviteit en dus tot een meer open houding.

Vier studies heb ik uitgevoerd (één cross-sectionele studie en drie experimentele studies) met als doel een cognitieve zelfbevestigingsneigingschaal te construeren en de eerste stappen te zetten wat betreft de validatie van deze schaal. Studie 4.1 was een cross-sectionele studie onder rokers en de resultaten lieten zien dat hoe sterker de cognitieve zelfbevestigingsneiging van mensen was, hoe meer negatieve consequenties ze waarnamen van roken. Dit suggereert de aanwezigheid van een open houding. Studie 4.2 liet het stabiele en betrouwbare karakter zien van de cognitieve zelfbevestigingsneigingschaal. Tevens liet Studie 4.2 zien dat een sterke cognitieve zelfbevestigingsneiging samenhangt met positieve beelden.

In Studie 4.3 en 4.4 kregen de deelnemers een bedreigende gezondheidsboodschap voorgeschoteld over de negatieve gevolgen van stress. De helft van de deelnemers kreeg een tekst waarin stond dat de gevolgen van te veel stress heel ernstig zijn (i.e., grote zelfbedreiging) en de andere helft werd verteld dat de gevolgen matig ernstig zijn. Studie 4.3 liet zien dat het actief gebruik maken van zelfbeeldherstellende beelden leidde tot hetzelfde patroon als het gebruik van zelfbevestigingsmanipulaties. Oftewel, aanwezigheid van positieve beelden leidt tot een sterkere intentie om de aanbevelingen in de tekst op te volgen. Dit effect was echter alleen aanwezig bij een matige zelfbedreiging. In Studie 4.4 ondergingen deelnemers tevens een zelfbevestigingsmanipulatie. De resultaten lieten zien dat voor deelnemers met een hoge zelfbevestigingsneiging de toevoeging van de zelfbevestigingsmanipulatie geen enkel effect had. Waarschijnlijk werd dit effect veroorzaakt door het feit dat mensen met een hoge cognitieve zelfbevestigingsneiging al toegang hadden tot positieve zelfbeeldherstellende beelden. Concluderend kan worden gesteld dat Hoofdstuk 4 de stabiliteit, de betekenis en de effecten aantoont van een schaal die de neiging meet van mensen om positieve zelfbeelden te gebruiken bij de omgang met een zelfbedreiging.

Deel 3: Gezondheidsboodschappen en Kanker

In Hoofdstuk 5 richt ik me op een specifieke gezondheidsdreiging, namelijk kanker. Deze ziekte is momenteel één van de belangrijkste doodsoorzaken (World Health Organization, 2007). Voorgaand onderzoek laat zien dat denken aan kanker leidt tot de onderdrukking van doodsgedachten (Arndt, Cook, Goldenberg, & Cox, 2007). Deze onderdrukking was zelfs sterker dan wanneer men werd gevraagd direct aan de eigen dood te denken. De vraag is dan ook waarom kanker een sterkere dreiging vormt. Vier experimentele studies zijn uitgevoerd om deze link is tussen kanker en doodsgedachten te onderzoeken. De nadruk ligt op de mate waarin mensen doodsgedachten onderdrukken. Het doel was om te laten zien of de associaties die mensen hebben bij het denken aan kanker (e.g., kanker wordt gezien als behandelbaar of juist niet) van belang zijn voor de manier waarop mensen met

doodsgedachten omgaan. In alle studies werd zelfbevestiging wederom toegepast om de onderliggende defensieve processen te ontrafelen.

Studie 5.1 bevestigde de uitkomsten van voorgaand onderzoek (Arndt e.a., 2007) en liet zien dat het denken aan kanker leidt tot een algehele onderdrukking van doodsgedachten. Studie 5.2, 5.3 en 5.4 lieten zien dat de link tussen kanker en doodsgedachten werd bepaald door de mate waarin mensen denken dat kanker behandelbaar is en de mate waarin ze denken dat kanker kan worden voorkomen. Als de deelnemers kanker als behandelbaar beschouwden dan bleek de dreiging nog mild genoeg en kon deze worden onderdrukt. Dit kan worden afgeleid uit het feit dat toevoeging van zelfbevestiging leidde tot een toename van doodsgedachten. Als de deelnemers kanker echter als slecht behandelbaar beschouwden dan bleek de dreiging te sterk om effectief te kunnen onderdrukken. Dit leidde tot meer doodsgerelateerde gedachten. Hetzelfde patroon van doodsgedachten werd gevonden als de denkbeelden van de deelnemers aangaande de mate waarin kanker kan worden voorkomen werden onderzocht.

In Studie 5.4 werden de deelnemers tevens geconfronteerd met een subliminale kankerdreiging. Dit wil zeggen dat de deelnemers de dreiging niet bewust konden waarnemen. De resultaten lieten zien dat zelfs bij deze onbewuste dreiging defensieve processen werden toegepast om de doodsgedachten te reguleren. Concluderend kan worden gesteld dat Hoofdstuk 5 laat zien dat de associaties van mensen betreffende kanker bepalen welke regulerende processen mensen hanteren om de doodsgedachten uit hun bewustzijn te weren.

Concluderende Opmerkingen

Het huidige proefschrift laat zien dat het behoud van een positief zelfbeeld een essentieel motief is van mensen in de omgang met gezondheidsboodschappen. Het benadrukken van de gezondheidsrisico's creëert een aversieve psychologische toestand die mensen willen reduceren of elimineren. Zelfbevestiging is een bruikbaar hulpmiddel om te achterhalen of mensen defensieve technieken toepassen in de omgang met een zelfbedreiging.

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